ECONOMICS OF DRY FARMING
IN
TAMIL NADU

R. K. SAMPATH
AND
JAYALAKSHMI GANESAN

PUBLISHED BY
SANGAM PUBLISHERS, MADRAS-1
FOR
MADRAS INSTITUTE OF DEVELOPMENT STUDIE

DRY FARMING is the way of life for the majority of Indian farmers.

In Tamil Nadu, 60 per cent of the cultivated land is under dry farming and 50 per cent of all farmers in the State are dry farmers.

The object of this study is to renovate dry farming and suggest programmes to increase the incomes of the dry farmers in the State, which should constitute one of the priorities of Tamil Nadu Development.

Thiru R. K. Sampath and Thirumathi Jayalakshmi Ganesan, research associates of the Madras Institute of Development Studies, in this book, the second of the series issued by the MIDS, have brought out within its covers the problems and their solutions in Dry Farming.

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WITH THEIR ASSISTANCE

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PREFACE

DRY FARMING is uniquely an Indian phenomenon. At first glance the term dry farming sounds like a contradiction in terms. Farming is a function of the trinity—land, water and seeds. Without any one of the three parts, there can be no farming. If dry farming means farming without water, we are in the realm of magic and folklore and not in the science and arts of cultivation. The term itself as used in India traces back to a British officer of the East India Company who invented the term to describe the arts of cultivation that he observed in some parts of the country, where limited and uncertain rainfall determined the nature and methods of cultivation. As an agricultural art, dry farming is not, however, uniquely Indian. It has existed since the dawn of agriculture in areas close to the deserts and in regions which have dry summers. As a term it came into use at about the same time in this country as in the United States of America where the Utah farming was described in 1863 as dry farming. Unesco has promoted a major research programme in this area, under the title of Arid and Semi-Arid Zones research which has helped establish the Arid Zone Research Institutes in Jodhpur, Karachi, Cairo and the Negev.

Dry farming is used in this study to refer to cultivation of land which has (a) no organised source of irrigation, (b) an uncertain rainfall of 400 to 1,200 mm. per annum and (c) problems of temperature, evaporation, wind erosion and special soil characteristics. What makes dry farming an uniquely Indian phenomenon, is that in no other country is as much as 80 per cent of the gross cropped area of the country farmed under such conditions. Sixty per cent of Indian farmers are dry farmers. The four years of bumper harvests that the country has enjoyed is traceable to timely and generous rains to a larger extent than to the new agricultural technology introduced in the I.A.D.P. areas. Dry farming is the way of life for the majority of Indian farmers.

In Tamil Nadu, 60 per cent of the cultivated land is under dry farming and 50 per cent of all farmers in the State are dry farmers. Over the last two decades, the State's cultivated lands has increased by over 30 per cent, the irrigated area by 18 per cent and dry farms by under 10 per cent. The trend in Tamil Nadu is towards a relative decline in the area under dry land farming and in the number of dry farmers. Their contribution to the State's total agricultural produc-

tion during this period has, however, remained the same, at 30 per cent. In dealing with dry farming in Tamil Nadu, the study is dealing with the working conditions and living levels of the majority of the people in the State.

The living levels of the dry farmers in the State can be seen in three indices. First, the gross income of the dry farmer averages Rs. 900 per hectare. The second, is that 60 per cent of rural households operate less than one acre of wet land or three acres of dry lands. Third, the net per capita income of the dry farmer in the State is around Rs. 180 per annum. Putting these three indices together gives rise to the presumption that the major incidence of the 55·19 per cent of rural people in Tamil Nadu who live below the Dandekar-Rath poverty line of 2,250 units of calorie consumption per day is the dry farming population of the State.

Under these conditions, the renovation of dry farming and a programme to increase the incomes of the dry farmers in the State should constitute one of the priorities of Tamil Nadu development. Such also is the objective of this study. The study, however, limits itself to an analysis of some of the economic preconditions that are necessary to attain this double objective of increased productivity of dry farming and increasing the net income of the dry farmers. It takes, as given the technological preconditions that are necessary for the dry farming renovation. These preconditions include (a) land use and development including water and moisture storing, (b) improved farm practices and crop rotation, (c) use of seeds of high yielding varieties which are drought resistant, drought evasive, dwarfed and of quick maturity, (d) inputs of appropriate packets of fertilisers and pesticides and (e) in the case of commercial crops particularly, use of appropriate new tools and machines. On all these five scientific and engineering preconditions, available information shows that research in the Country and State and demonstration of the results on a sufficiently large area in Tamil Nadu and in other States have reached a point, where it is possibly the economic factor of credit supply and to lesser extent marketing arrangements for the increased dry crop production which are now holding up the spread of the new technology to dry farming in the State.

That at least is the assumption in this monograph. It simply summarises (in appendices) the available scientific information with

regard to HYV seeds and the needed fertilisers and pesticides for bringing about a break-through in dry land farming in the State, similar to that which has taken place in its irrigated areas. On this basis it is computed that the new technological packet for the dry farm, calls for an additional average investment of Rs. 200 per hectare. This figure of Rs. 200 is arrived at after an analysis of the cost/income of using the HYV strains adapted to dry farming in five of its major crops—cumbu, cholam, ragi, cotton and groundnut. As the dry farmer is a small farmer working and living at a subsistence level, the additional cost of Rs. 200 per hectare for introducing the new technology must be made available to him in the form of credit. It is proposed that starting with the Fifth Plan, a fifteen-year programme be launched to bring all the 37,95,000 hectares of dry farms under the High Yielding Varieties Programme. For the Fifth Plan it is proposed to start in the three districts of Ramanathapuram, Dharmapuri and Tirunelveli. This means that the State's Fifth Five-Year Plan must make a provision for Rs. 33·4 crores to cover 11,72,000 hectares of dry farms in these three districts. The institutional arrangements for this credit flow are examined in some detail. Similarly, marketing arrangements will need to be made through co-operative and regulated markets. A Dry Farming Authority is proposed to begin functioning in these three districts in order to ensure the effective planning, execution, credit and input distribution and marketing of the increased production. The cost benefit analysis of this programme shows that the income of the dry farmer will increase by three to four times that of his present level, as he adopts this package of practices.

As the study was completed, the Agricultural Prices Commission has made three recommendations which institutionalise the main suggestion emanating from this study. The Commission proposes the creation of a farmers' service agency at the block level and a union of these societies at the district level to meet in an integrated manner the credit input and marketing needs of the small farmer. The new agencies proposed, which could be organised initially at the village rather than the Block level in the three districts, where the dry farming programme is recommended to be launched in Tamil Nadu—Ramanathapuram, Dharmapuri and Tirunelveli—should each serve around 1,000 dry farming families and provide to the farmer the complete range of services up to and including marketing. It is also urgent that

the other recommendation of the Commission be accepted by the Government—namely that at the national level, at least 40 per cent of the funds allocated for agricultural credit by the Reserve Bank of India as also of Commercial Bank loans, should go to the small and marginal farmers. If these two recommendations are acted upon, the Union Government can provide during the Fifth Plan its share of Rs. 23·4 crores out of the total of Rs. 33·4 crores for the proposed dry farming programme in the State. The proposed Dry Farming Authority could use these institutions to renovate dry farming in the State. There will thus be an institutional frame for executing the programme effectively.

This monograph is the second in the series published by the Madras Institute of Development Studies as part of its programme of empirical studies of agro-rural problems of the State. It is addressed to the Government departments in the State and to the specialists in the dry farming field. Its authors, R. K. Sampath and Jayalakshmi Ganesan, Research Associates of the Institute used available data from the Directorate of Agricultural Education and the Tamil Nadu Agricultural University, in this first attempt, at identifying the economics of dry farming in the State. They have been assisted by the staff of the Institute and the officers of the Departments of Agriculture and Co-operation and the staff of the Tamil Nadu Agricultural University. The opinions and judgments expressed in the study are, however, the sole responsibility of its authors, R. K. Sampath and Jayalakshmi Ganesan.

I commend the conclusions to the attention of the Government authorities and specialists working in this area.

Madras,
December 30, 1971.

CHAPTER I

AIM AND METHOD OF THE STUDY

THE aim of this study is to assess the importance of a renovated system of dry farming in the State and to review the economics of the system. It does not deal with the technological or scientific aspects of the renovation of dry farming, but with its economic and institutional preconditions and problems. The assumptions made in the study are:

(*i*) the technology of dry farming as of today has reached a sufficient stage of maturity in the Country and Tamil Nadu so that a start can be made in applying it ;

(*ii*) the break-through in dry farming is currently being held up by economic and institutional factors and not by the level and availability of its technology ;

(*iii*) agrarian restructuralisation including ownership rights for the cultivator, tenancy records and consolidation of holdings through co-operatives now under way in the State will be effectively completed ;

(*iv*) an analysis of the economic feasibility of the proposed technologies for dry farming is essential to ensure that they can bring increased incomes to the farmer ;

(*v*) the costs of introducing the new technologies are within the financial resources of the State and the Country; and

(*vi*) the principles of distributive justice and the effective tackling of the poverty of the mass of the farming community in the State demand a programme in dry farming.

Assumptions two, four and five which are within the terms of this study will be further examined, reviewed and synthesised to the extent that the available data makes possible.

Dry farming refers to cultivation of areas which have inadequate and uncertain rainfall. Areas where the rainfall is higher than 1,200 mm. may be considered to have the same production potential as irrigated areas. Areas receiving an annual rainfall below 400 mm. can be classed as dry and as being in need of special attention and specified techniques in order to improve their production. The problem zones of dry farming are those areas which have an annual rainfall between 400 mm. and 1200 mm. They cover 160 million hectares of the total area of 330 million hectares in the Country. These dry areas are characterised by low and uncertain rainfall, high annual evaporation (2,000—3,500 mm.) and high summer temperature.

This inadequacy and uncertainty of rainfall often lead either to partial or complete failure of harvests. They result in serious famine or near-famine conditions because the major part of the total cultivation in the State and the Country is carried on under unirrigated conditions. Dry farming has commanded widespread attention in the Country from as early as the eighties of the last century. The Royal Commission on Agriculture (1928) in its report made the following observation :

> " In the earlier years of their history, the departments of Agriculture applied themselves first to research on those crops which offer the best prospects of success and which, in the main, were crops grown under irrigation. It happens, moreover, that those crops that have received least attention such as millets are amongst the typical crops in most of unirrigated districts. The problems of cultivation in such tracts in which crops are entirely dependent upon rainfall are, in our opinion, deserving of far more attention than they have received from agricultural departments. "

Except Maharashtra, no other State has taken this suggestion seriously. The State of Maharashtra pioneered a systematic and scientific approach to the problems of dry farming about 50 years ago. It also achieved commendable progress in contour bunding programmes. But because of the inadequate attention paid to other aspects, particularly the consolidation of land holdings, the expected results with respect to agrarian advance and stability of production were not achieved in that State.

The main problems that these rainfed areas are confronted with are :

(*i*) shortage of water from rainfall and unpredictable distribution of rainfall ;

(*ii*) lack of suitable crop varieties adapted to the rainfall period and soil moisture conditions of the unirrigated areas ;

(*iii*) uncontrolled flow of water from field to field ;

(*iv*) steep slopes in undulating lands leading to wasteful run off ; and

(*v*) excess water in low areas lacking adequate drainage.

The dry farming research and demonstration programmes of the Indian Council of Agricultural Research and those carried out more recently by the Agricultural University and the State Demonstration Farms in Tamil Nadu have established the lines of action to meet these problems. An economic interpretation of these programmes involves a study of their feasibility, profitability and financial implications. For this, an attempt is made in subsequent chapters to use the cost-return analysis tool with special reference to the High Yielding Varieties (HYV). Further a comparative analysis of the cost-return for different crops under HYV and traditional varieties of crops is attempted. On this basis an economic evaluation of the two varieties is offered. In this context the difficulties faced by the farmer in credit flow and marketing are analysed and recommendations are made to meet those problems.

IAPTER II

DRY FARMING IN TAMIL NADU (1950—70)

AS in other parts of India, Tamil Nadu does not have adequate, assured irrigation over large areas. In 1970-71, 7,531 thousand hectares of land were cultivated in the State. Of this only 3,279 thousand hectares were irrigated, i.e., 43·5 per cent of the total cropped area. The remaining 4,252 thousand hectares, i.e., 56·5 per cent of the total cropped area, were unirrigated. This area depends entirely on the monsoon and it is this area which is termed the dry area. For the vast majority of people in this area, cultivation is the primary occupation. The green revolution confined mainly to crops grown under irrigation is yet to touch this majority. The risk of total loss is greater in the dry areas and the cultivator who invests in fertilizers and better seeds faces a hazard which his counterpart in the green revolution belt does not. Apart from this, the dry cultivation tracts are poorer and the standard of living of the farmer is much lower than in the irrigated region.

In Tamil Nadu, as stated earlier, nearly 60 per cent of the gross cultivated area is under rainfed condition. The share of unirrigated area to total cropped area has not changed significantly despite 20 years of planned development and dry land farming continues to be a significant sector of the economy. Dry lands contribute about 30 per cent of the total agricultural production. Actually during the two decades, 1950-70, the gross cultivated area under unirrigated conditions has increased from 3,885 thousand hectares in 1951-52 to 4,252 thousand hectares in 1970-71, registering an increase of 367 thousand hectares over the 1951-52 level. This is an increase of 9·45 per cent over two decades. In comparison, the gross cropped area has increased from 6,357 thousand hectares in 1951-52 to 7,531 thousand hectares in 1970-71, registering an increase of 18·47 per cent, i.e., 1,174 thousand hectares, over the 1951-52 level ; and the gross irrigated area has increased from 2,472 thousand hectares in 1951-52 to 3,279 thousand hectares in 1970-71, registering an increase of 32·65 per cent, i.e., 807 thousand hectares, over the 1951-52 level.

The main causes for the slower growth of unirrigated areas, i.e., dry areas, in comparison with the gross cropped area and gross irrigated area are :

(*i*) The number of units of previously uncultivated dry lands now being brought under dry farming is not large. The scope for extending the cultivation of dry areas is, therefore, limited in the State.

(*ii*) Slowly dry lands are converted into irrigated lands because of the irrigation facilities made available through Plan programmes.

Another dry farming feature seen in Table 1, attached to the end of the chapter, is that the number of hectares of dry lands sown more than once has not shown any increase. Actually the gross dry area sown more than once has fallen from 458 thousand hectares in 1951-52 representing 11·8 per cent of gross unirrigated area to 457 thousand hectares in 1970-71 representing 10·75 per cent of gross unirrigated area. It fell to 211 thousand hectares in 1956-57, and 303 thousand hectares in 1963-64. During 1954-58 and 1963-70, the gross unirrigated area cultivated more than once was below 400 thousand hectares. On the other hand, during the two decades, the net area irrigated sown more than once increased from 474 thousand hectares in 1951-52, representing 23·7 per cent of net irrigated area to 793 thousand hectares in 1970-71 representing 31·9 per cent. This is an increase of 67·3 per cent over the 1951-52 level. The net area irrigated sown more than once reached a peak of 894 thousand hectares in 1956-57.

Tamil Nadu's share of dry farming at 60 per cent is lower than the all-India share of 80 per cent. However, this lower relative share of gross unirrigated area to gross cropped area of the State covered wide variations in the share as between the districts in the State. For some districts like Thanjavur * the gross unirrigated area is only 15 per cent of gross cropped area, whereas in the Nilgiris ** it is as high as 98 per cent. The definition of a 'dry area' is, as stated in Chapter I, an area which has a rainfall of 400—1,200 mm. Using

* Refer Table 3, Appendix 1 to Chapter II.

** The Nilgiris has a rainfall of more than 1,400 mm. So it has the same potentialities of production as an irrigated area. It cannot, therefore, be considered as a 'dry area'.

this definition as a norm, Dharmapuri is the most dry area. About 85 per cent of the gross cropped area in that district is unirrigated. Next comes Tiruchirapalli with 68—70 per cent of its gross cropped area being unirrigated, followed by Salem with 67·3 per cent, Tirunelveli with 64·8 per cent, Coimabtore and Madurai each with 63·6 per cent, Ramanathapuram with 60·4 per cent and North Arcot with 51 per cent.

Chingleput, South Arcot, Kanyakumari and the Nilgiris cannot be classified as dry areas because the average rainfall in each of these districts is above 1,200 mm. per year. They have the same production potentialities as an irrigated area. Within such districts, there may, of course, be areas, which receive a lower rainfall than what, on an average, the district gets. But they do not face the common problems that a dry area with a rainfall of 400—1,200 mm. faces.

This narrative does not provide a clear enough picture of how the total unirrigated cropped area for the State as a whole is distributed among several districts. Table 5 attached at the end of the chapter summarises the details of the inter-district variations. In 1967-68, of the total unirrigated area of 34,53,900 hectares, 14·48 per cent is found in Tiruchirapalli, 12·63 per cent in Coimbatore, 11·26 per cent in Ramanathapuram, 10·52 per cent in Madurai and 9·80 per cent in Dharmapuri. All other districts together share less than 10 per cent of the total unirrigated cropped area. So any programme aimed at improving the conditions of dry farmers must cover the following seven districts, viz.,

(1) Dharmapuri,
(2) Ramanathapuram,
(3) Tirunelveli,
(4) Tiruchirapalli,
(5) Coimbatore,
(6) Madurai, and
(7) Salem.

These together cover 75·59 per cent of the total unirrigated cropped area of the State of Tamil Nadu.

The districts which have lower irrigation facilities are also the districts which have in general lower rainfall per year. This is

evident from the table below :

Districts	Irrigated area as percentage of cropped area	Rainfall per year (in mm.)
1. Chingleput	69·3	1211·0
2. Thanjavur	84·5	1147·8
3. South Arcot	49·0	1188·9
4. North Arcot	51·4	971·1
5. Kanyakumari	38·9	1469·7
6. Ramanathapuram	39·6	839·5
7. Madurai	36·4	854·8
8. Coimbatore	36·4	718·4
9. Tirunelveli	35·2	814·8
10. Tiruchirapalli	31·6	877·1
11. Salem	32·7	859·8
12. Dharmapuri	14·8	843·6

Source : Season and Crop Reports for Tamil Nadu, 1966-67 and 1967-68.

This discussion of dry areas in terms of their magnitude, extent and distribution leads to two questions in the study of dry farming :

(*i*) What are the climatic and geological characteristics of these dry areas ?

(*ii*) What are the crops that are grown in these dry areas ?

The first question with its reference to geological and meteorological studies is dealt with in Appendix 2 of this chapter. The second question relating to dry crops could be examined under the following main subject heads :

(*a*) The common dry crops of Tamil Nadu;
(*b*) The growth of five dry crops during 1950-70 in terms of

(*i*) area under cultivation
(*ii*) yield per hectare
(*iii*) total production and causes for slower growth;

(*c*) Comparison beween all-India and Tamil Nadu; and
(*d*) Contribution of dry lands to total agricultural production.

The Common Dry Crops of Tamil Nadu

The common dry crops of Tamil Nadu are millets like cumbu, cholam, ragi and maize, pulses like red-gram, Bengal-gram. etc., and oil-seeds like groundnut, gingelly, castor and cotton. The extent of cultivation of dry and wet crops in the State is set forth in Table 2 attached to the chapter. Paddy occupies 36·4 per cent of the total cultivated area followed by groundnut with 14·6 per cent, cholam with 9·6 per cent, cumbu with 5·9 per cent, ragi with 4·3 per cent and cotton with 4·0 per cent. The main reason for paddy, which is an irrigated crop, being cultivated in large areas is the high profit that it yields to the farmer.

In the 1967-68 cropping pattern, 92·9 per cent of the cropped area under paddy is irrigated, whereas for cholam the irrigated area formed only 22·1 per cent of the total cropped area ; for cumbu 12·7 per cent; for ragi 48·1 per cent; for cotton 29·4 per cent and for groundnut 17 per cent.

Thus in Tamil Nadu of the six important crops, the cultivation of which forms 74·8 per cent of the total cropped area, five—cholam, cumbu, ragi, cotton and groundnut—are predominantly grown under unirrigated conditions and depend on rainfall for their sustenance. For the analysis of dry farming, these five crops are taken as representative dry crops of Tamil Nadu. *

The Growth of Five Dry Crops during 1950-70

Cholam : Among the millets of Tamil Nadu, cholam is the predominantly cultivated crop. According to the 1966-67 data, it is cultivated in 7,43,147 hectares in the State. Of this 80·66 per cent of the area is unirrigated. But the percentage of area under dry farms varies from district to district. It is as high as 100 per cent in the Nilgiris and Kanyakumari, 97·77 per cent in Dharmapuri, 95·44 per cent in South Arcot, 86·83 per cent in North Arcot, 86·37 per cent in Tiruchirapalli, and as low as 3·55 per cent in Thanjavur, 34·48 per cent in Tirunelveli and 44·01 per cent in Chingleput. (Refer Table 4 at the end of the chapter.)

* A brief description of each of these crops is given in Appendix 3 of this chapter.

Inter-district variations are also observed in the percentage distribution of gross cropped area under cholam. Table 8 (at the end of the chapter) shows that Coimbatore occupies 28 per cent of the gross cropped areas under cholam followed by Salem (including Dharmapuri) with 18·45 per cent, Tiruchirapalli with 17·88 per cent, Madurai with 17·21 per cent, South Arcot with 5·67 per cent, Ramanathapuram with 2·47 per cent, Tirunelveli with 4·47 per cent and North Arcot with 5·43 per cent. The Nilgiris, Kanyakumari and Chingleput occupy insignificant proportions of the total. The first four districts share among themselves 81·54 per cent of gross cropped area under cholam for the State. So any programme aimed at augmenting the production potential of cholam should be concentrated on these districts. In terms of production, these four districts produce the major portion of the total. Their share is 78·92 per cent which is slightly lower than their share in hectarage. South Arcot, North Arcot, Salem (including Dharmapuri), Madurai, Ramanathapuram and Tirunelveli produce more than their share in area under cultivation, because of higher productivity achieved per hectare in these districts. The highest yield per hectare (omitting Thanjavur which is an irrigated area) is recorded by Tirunelveli with 1012 kg. per hectare, followed by South Arcot with 849 kg., Madurai with 844 kg. and Salem with 821 kg. Tiruchirapalli has the lowest yield per hectare with 587 kg.

The progress made by cholam during the last two decades covering four Plans is limited in terms of area under cultivation, yield per hectare and total production.

Table 7 and Charts 1, 2 and 3 at the end of the chapter, show the progress made by cholam during 1950-70. The average annual increase in area is 660 hectares per year. The annual increase in production and average yield per hectare work out at 7,600 tonnes and 10·46 kg. respectively. They represent an annual percentage increase of 1·62 for yield per hectare, 0·09 increase for area under cultivation, and 1·65 increase for production during the two decades, 1950-70.

The main reason for the slow growth of area under cultivation of cholam is that the area irrigated under cholam has been increasingly shifted to the cultivation of other crops. The area has fallen from a peak level of 179 thousand hectares in 1954-55 to a low level of 142 thousand hectares in 1963-64. It stands at 152 thousand hectares in

1970-71. But it should also be noted that the unirrigated area under cholam has increased from 558 thousand hectares in 1951-52 to a peak level of 662 thousand hectares in 1964-65, representing an increase of 18·6 per cent. It stands at 597 thousand hectares in 1970-71.

What is the reason for this overall slow progress of cholam? It is believed that the lag is due to cholam production becoming less profitable. This cannot be true because during the nineteen-sixties, the gross income per hectare for cholam has increased from Rs. 294 in 1960-61 to Rs. 549 in 1969-70. This is an increase of 86·73 per cent over the 1960-61 level (an average increase of 8·7 per cent). It is true that compared to other crops, the increase in gross income of cholam is low. The slower growth of gross income cannot be attributed to a lag in prices, because the price of cholam has increased by 97·72 points in 1968-69, over the base year 1960-61. This rise is higher than that of all other dry crops for the same period. Groundnut overtook cholam reaching in 1969-70, 253·71 points, while cholam fell to the second place with 193·73 points. The real reason for the slower growth of the gross income from cholam is due to the decrease in its average productivity. It was 75·4 per cent of the base year productivity in 1968-69 and 91·4 per cent in 1969-70. (Refer to Table 10 at the end of the chapter.)

Cumbu: According to the 1966-67 data, cumbu is cultivated in 4,14,672 hectares. Out of this area, 88·50 per cent is unirrigated. The extent of dry lands under the cultivation of cumbu expressed as a percentage of the gross cropped area of the district is not, however, the same in all districts. It is as high as 100 per cent in the Nilgiris and Kanyakumari and as low as 41·89 per cent in Chingleput. Here too, inter-district variations are observed with regard to the percentage distribution of gross cropped area among several districts. 22·74 per cent of the cropped area is occupied by Tiruchirapalli, 17·35 per cent by Salem (including Dharmapuri), 15·39 per cent by Tirunelveli, 13·61 per cent by Coimbatore, 11·29 per cent by Ramanathapuram, 10·42 per cent by South Arcot and the rest 9·20 per cent is shared by six other districts. Thus, the first six districts cultivate 90·80 per cent of the gross cropped area and produce 91·76 per cent of the total crop, which is slightly higher than their share in cropped area. For increasing the production of cumbu, urgent attention needs to be focussed on increasing the yield per hectare in these 6 districts. Another feature of cumbu production is the differences in average yield per

hectare in different districts. It is as high as 895 kg. per hectare in Madurai and as low as 561 kg. and 579 kg. in Dharmapuri and Chingleput respectively. (Refer Table 8 at the end of the chapter.)

The progress made by cumbu in terms of area under cultivation, yield per hectare and total production during 1950-70 is set forth in Charts 4, 5 and 6 and Tables 6, 7 and 10 at the end of the chapter.

Chart 4 and other tables show that the area under cultivation of cumbu has been steadily falling from 1954-55. The area under cumbu was at its peak in 1954-55, with 610 thousand hectares under cultivation. It has declined to the lowest level of 400 thousand hectares in 1965-66 (402 in 1968-69), registering a decline of 34·40 per cent from its peak level. On the basis of the time-series analysis (by fixing a straight line to the data to observe the 'secular trend'), it is computed that every year the area under cultivation of cumbu has been declining by 9,680 hectares. The decline in the irrigated part of the gross cropped area is marked. It has declined from the peak level of 118 thousand hectares in 1954-55 to the low level of 46 thousand hectares in 1964-65, a decline of 61·02 per cent. In the case of the unirrigated area, the decline is 43·90 per cent from 620 thousand hectares in 1953-54 to 348 thousand hectares in 1968-69.

Though the area under production has fallen considerably, total production has increased from 265 thousand tonnes in 1951-52 to 321 thousand tonnes in 1970-71, registering an increase of 21·13 per cent. On the basis of the time-series trend, it is computed that production has been increasing by 3,320 tonnes every year on an average. This increase in production, in spite of the considerable decline in the area under cultivation, is largely due to the increased yield per hectare. During 1950-70, it is calculated that the yield per hectare has been increasing by 16·22 kg. per year.

Though the overall trend of production during the two decades, 1950-70, has been favourable, the trend of production during 1960-70 is unfavourable. Compared to the base year 1960-61, both production and yield per hectare have been low in the subsequent years. The production and yield indices in Table 10 at the end of the chapter show this clearly.

The main reason for the decline in area under production of cumbu is the low gross income and consequently low net income that it yields

per hectare. Table 11 shows that the gross income per hectare is low for cumbu. This is the situation throughout the nineteen-sixties compared to other crops. The gross income per hectare for cumbu works out at Rs. 440, whereas for cholam it is Rs. 549, for ragi Rs. 631, for cotton Rs. 1,102 and for groundnut Rs. 1,212 in 1969-70. Hence unless the yield per hectare for cumbu is considerably expanded, there will not be an increase in the area under cultivation.

As far as the price of cumbu is concerned; the situation has been favourable throughout nineteen-sixties. The price index has gone up from 100 in 1960-61 to 192·10 in 1968-69.

Ragi: Of the gross cultivated area of 314 thousand hectares under Ragi, 168 thousand hectares are unirrigated. It forms 53·5 per cent of the gross cultivated area. But once more the extent of unirrigated area is not uniform throughout the State. It is as high as 100 per cent in the Nilgiris and Kanyakumari both of which, strictly speaking, do not come under the definition of 'dry lands' as noted earlier. It is 94·90 per cent in Dharmapuri. The unirrigated cropped area under cholam is 20 per cent in four districts, viz., South Arcot (14·37 per cent), Thanjavur (19·90 per cent), Madurai (14·48 per cent) and Tirunelveli (4·75 per cent). Inter-district variations are also observed with regard to the distribution of production and gross cropped area under ragi. Salem (including Dharmapuri) occupies the highest share with 41·04 per cent of the gross cropped area, followed by Coimbatore with 12·60 per cent, North Arcot with 8·85 per cent, Ramanathapuram with 8·67 per cent and Chingleput with 7·79 per cent. The rest, 21·05 per cent, is shared by all the other districts. The first five districts together share 78·95 per cent of the total cropped area and contribute 77·1 per cent of the total production. This discrepancy between production and area is due to Salem, Ramanathapuram and Chingleput contributing less to production than their share in area under cultivation. (See Table 8 at the end of the chapter.) Wide inter-district variations in average yield per hectare should also be noted. It is as high as 1,459 kg. per hectare in Tirunelveli and as low as 728 kg. per hectare in Tiruchirapalli.

The progress made by ragi during the last two decades in terms of area under cultivation and total production has been low even though the progress made by yield per hectare is substantial. This is evident from Charts 7, 8 and 9, and Tables 6, 7, 10 and 12 at the end of the Chapter. From an analysis of the trend, it is found that the area

under cultivation of ragi has been falling by 2,000 hectares every year and production has been declining by 1,220 tonnes every year. But the yield per hectare has been going up by 5·46 kg. per year. According to the trend values for each year, production has declined by 24,400 tonnes during the last twenty years and area has fallen by 40,000 hectares during the last twenty years ; but the yield per hectare has gone up by 109·20 kg. in that period.

The area under ragi was 333 thousand hectares in 1951-52 ; it reached the peak level of 370 thousand hectares in 1954-55 and declined to 295 thousand hectares in 1968-69, a decrease of 20·50 per cent compared to the peak level. This decline of 75 thousand hectares in 1968-69 was due to the 32 thousand hectares decline in unirrigated areas and 43 thousand hectares in irrigated areas. On the whole the progress made by unirrigated areas is positive compared to the negative results of the irrigated areas. In 1970-71, the total irrigated area under ragi is 148 thousand hectares compared to 177 thousand hectares in 1951-52. With regard to unirrigated areas, the extent of area under ragi is 190 thousand hectares in 1970-71 compared to 156 thousand hectares in 1951-52.

The main reason for this negative growth of the area under cultivation of ragi and in consequence the decrease in total production of ragi, is the slower growth of gross income. This in turn is due to the slower growth of increase in yield per hectare and the lower rate of increase in the price of ragi. During the nineteen-sixties, for no year has the area under cultivation, total production and productivity been higher or equal to that of the base year (1960-61). And as noted earlier the price of ragi has risen less than the prices of all other commodities during the period 1960-70. The gross income of ragi has increased from Rs. 351 per hectare in 1960-61 to Rs. 631 in 1969-70. Even though the absolute increase in gross income per hectare for ragi is higher than that for cholam and cumbu, the percentage increase is lower than those for them. In this context it should also be noted that the cost of cultivation per hectare for ragi is much higher than that for cholam and cumbu. This further diminishes the value of the increase in the gross income of ragi * which is in any case lower.

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* Refer Chapter 3

The cost of cultivation per hectare of cholam	:	Rs. 304·15
„ „ cumbu	:	Rs. 237·52
„ „ ragi	:	Rs. 420·30

Thus the progress and importance of ragi in terms of area under cultivation and total production has been diminishing year after year during the last twenty years—a diminution due to the lower profitability of the crop.

Cotton: Cotton is one of the most important commercial crops of the State, as well as of the country. It is grown in 313 thousand hectares, of which 86 thousand hectares are irrigated (which forms 27·5 per cent of the total area) and 227 thousand hectares are unirrigated. Thus dry areas form 72·50 per cent of the total area under cultivation of cotton. But this is not uniform throughout the State. (Refer Table 4.) Dry areas form as much as 97·90 per cent of the total cultivated area under cotton in North Arcot, 90·66 per cent in Thanjavur and are as low as 46·39 per cent in Chingleput and 47·20 per cent in Coimbatore. Of the total cultivated area under cotton as much as 32·89 per cent is cultivated in Coimbatore, 26·70 per cent in Tirunelveli, 16·36 per cent in Ramanathapuram and 13·17 per cent in Madurai. The rest, 10·88 per cent is shared by all other districts. (Refer Table 8.) The first four districts together contribute 89·12 per cent of the total cultivated area under cotton and contribute 89·10 per cent of the total production. The yield per hectare is as high as 318 kg. (lint) per hectare for Thanjavur and as low as 149 kg. for Ramanathapuram.

The overall progress made by cotton in terms of area, production and yield during 1950-70 has been uneven, but favourable. The area under cotton which was 350 thousand hectares in 1951-52 registered a sharp increase by 100 thousand hectares in 1955–56, rising to 450 thousand hectares. This is an increase of 29 per cent over the 1951-52 level. But this level was never reached afterwards. At present in 1970-71, it stands at 330 thousand hectares. Though there are wide year-to-year fluctuations, the overall trend is upward as the trend analysis in Chart 10 at the end of the chapter shows. Every year the area under cotton has been increasing at a rate of 1,620 hectares during 1950-70, i.e., an overall increase of 32·4 thousand hectares, an increase of 9·26 per cent over the 20-year period, or on an average 0·93 per cent per year. The main cause for the wide fluctuations in the area under cultivation during 1950-70, is the variations in the area cultivated under unirrigated conditions, with its dependence on the monsoons. In 1951-52, the total unirrigated area under cotton was 279 thousand hectares. This sharply increased to

400 thousand hectares in 1954-55 registering an increase of 121 thousand hectares, being an increase of 43·37 in three years, i.e., 14·46 per cent per year. This should be compared with the general increase of 0·93 per cent per year. But since 1954-55 the unirrigated area under cultivation of cotton has started falling from its peak level to which it has not so far returned. In 1968-69, it reached the low level of 211 thousand hectares. Irrigated cotton also fell to 71 thousand hectares compared to its peak level of 113 thousand hectares in 1963-64. Comparing the decades 1950-60 and 1960-70, the first decade was a better period in terms of area under cultivation of cotton. Over the ten years (1951-60) altogether 3,912 thousand hectares were cultivated, i.e., an arithmetic average of 391·2 thousand hectares per year, of which 912 thousand hectares were irrigated and 3,000 thousand hectares were unirrigated (on an average of 300 thousand unirrigated hectares and 91·2 thousand irrigated hectares per year under cultivation during 1951-60). During 1961-70, the overall hectarage under the cultivation of cotton was 3,435 thousand, which was lower than that for the 1951-60 decade by 477 thousand hectares, i.e., a decrease of 12·2 per cent. The respective figures for irrigated and unirrigated areas under cultivation of cotton during 1961-70 were 912 thousand hectares and 2,523 thousand hectares respectively. Thus the area under irrigated conditions for cotton has not changed during 1961-70 compared to the previous decade. The area under unirrigated cultivation of cotton for that period (1961-70) has, however, declined from 3,000 thousand hectares in 1951-60 to 2,523 thousand hectares for 1961-70, a decline of 477 thousand hectares. This is an indication of the change in the cropping pattern that has occurred during 1961-70 in dry cotton areas of Tamil Nadu.

With regard to production, wide inter-year variations through the period 1950-70 may be noted in Table 7 at the end of the chapter. It was at its peak level in 1969-70 with 397 thousand bales (lint). The overall trend for the production of cotton is upward. It has been rising by 4,300 bales per year during 1951-70. The total production for ten years during 1951-60 was 3,191 thousand bales (on an average 319·1 thousand bales per year) which rose to 3,400 thousand bales during the next ten years, i.e., an increase of 6·55 per cent over 10 years, i.e., 0·66 per cent per year. This increased production is recorded in spite of the fact that the total area under cultivation for the ten years has declined by 477 thousand hectares, i.e., 12·2 per cent.

The increased production was entirely due to increase in yield per hectare which is steadily increasing annually. The trend analysis of 20 years (see Chart 12 at the end of the chapter) shows that the yield per hectare has been increasing by 9·6 kg. of lint, (i.e., 28·8 kg. of kapas) per year.

Why then is there this decline in hectarage under the cultivation of cotton for the decade 1961-70 ?* Is it due to the price factor or is it due to lower gross income? Is it due to higher cost of production or is it due to lower profit per hectare or per rupee invested?

None of these explanations seem to fit. The price of cotton has gone up by 87·2 per cent in 1969-70 compared to 1960-61 (see Table 12), gross income per hectare has also gone up from Rs. 474 per hectare to Rs. 1,102 per hectare in 1969-70 registering an increase of 132·28 per cent over the 1960-61 level;† cost of production is also low (Rs. 480 per hectare) compared to the cost of production of groundnut for which the area under cultivation during nineteen-sixties has increased ; and profit per hectare is relatively high for cotton, viz., Rs. 285 per hectare.‡ Incidentally it should also be observed that for traditional varieties as well as for high yielding varieties, the net return per kg. of produce and the net return per rupee invested are the highest for cotton. Hence the explanation that suggests itself for this decline is the failure of the monsoons during 1960's. Of nine years considered for which data are available (refer Table 1, Appendix 2) in six years the monsoon has failed. It has failed consecutively for five years from 1961-62 to 1965-66. And during these five years, the unirrigated areas under cotton (Table 6, Appendix 1) declined sharply.

Groundnut : Groundnut is the most important commercial crop of the State both in terms of area and production and in terms of value of production. According to the 1966-67 data, groundnut is cultivated in 994 thousand hectares out of which 854 thousand hectares are unirrigated constituting 90·1 per cent of the total cultivated area. The extent of unirrigated area to total area differs from district to district. It varies from 100 per cent in the Nilgiris and Kanyakumari (both of

* This trend is opposed to the overall trend for 20 years which is upward.

† Refer Chapter 3.

‡ Refer Chapter 3.

which are not dry areas), 97·39 in Dharmapuri, 95·10 in Salem, 92·77 in Ramanathapuram, 90·76 in North Arcot, to 57·80 per cent in Tirunelveli and 61·12 per cent in South Arcot. Of the total cultivated area, the six districts, South Arcot (15·89 per cent), North Arcot (21·51 per cent), Salem including Dharmapuri (14·23 per cent), Coimbatore (13·05 per cent), Tiruchirapalli (11·17 per cent), and Madurai (10·75 per cent) account for 86·60 per cent of the total cultivated area under groundnut. 86·60 per cent of total production is contributed at by these six districts. Here too wide inter-district variation in yield per hectare may be noted. The yield varies from 1,002 kg. per hectare in Madurai, Ramanathapuram and Tirunelveli to 650 kg. per hectare in Tiruchirapalli and Thanjavur. These variations are due to the existence of different kinds of farming practices adopted, different soil fertilizers, different endowment of factors of production, etc.

The groundnut record during the two decades in terms of area, production and yield is somewhat unusual in the sense that even though yield per hectare has been declining (see Chart 15 at the end of the Chapter), area and production have both increased.

The gross area cultivated under groundnut was 781 thousand hectares in 1951-52. This increased to the peak level of 1,066 thousand hectares in 1967-68, registering an increase of 36·5 per cent. The overall trend during 1951-70 was upward. According to trend values calculated (see Chart 13 at the end of the Chapter) the area under groundnut has been increasing by 16·440 hectares every year. This increase ranges over increases in both the irrigated area and the unirrigated area. The irrigated area has increased from 53 thousand hectares in 1951-52 to the peak level of 181 thousand hectares in 1967-68 (nearly 3·5 fold increase) and unirrigated area has increased from 779 thousand hectares in 1951-52 to 885 thousand hectares in 1966-67 (an increase of 13·6 per cent).

With regard to production, the trend is favourable. Production has been increasing by 9,800 tonnes per year over the last 20 years. From 1964 the trend is unfavourable. Production has declined from 1,145 thousand tonnes in 1962-63 to 1,109 thousand tonnes in 1963-64,

920 in 1964-65, 823 in 1965-66, 844 in 1966-67 and now in 1970-71 it stands at 917 thousand tonnes.

For the decade 1961-70 as a whole, the total production is 9,485 thousand tonnes compared to 8,609 thousand tonnes for the decade 1951-60. This is an increase of 9·01 per cent for a decade (1961-70) i.e., an annual growth rate of 0·91 per cent.

The main reason for the slower growth of production during 1961-70 was the fall in productivity. The average yield per hectare has fallen from 1,217 kg. per hectare in 1963-64 to 860 kg. in 1965-66, 849 kg. in 1966-67 and 843 kg. in 1967-68. It picked up again to 948 kg. in 1968-69 and declined again to 927 kg. in 1969-70 and 916 kg. in 1970-71 (see Table 7). It is lower than the levels achieved during the 1951-65 period when the average yield was well above 1,000 kg. per hectare.

The faster growth of area under groundnut during 1951-70 compared to all other dry crops is attributable to

(*i*) the rate of increase in the price of groundnut which was much higher than that for the other four dry crops. The price of groundnut per quintal rose by 153·71 points by 1970-71 (1960-61=100) (Refer Table 12);

(*ii*) gross income per hectare which as a consequence of higher prices has increased from Rs. 627 per hectare in 1960-61 to Rs. 1,212 in 1969-70 (Refer Table 11); and

(*iii*) the net return per hectare which at Rs. 225 is higher than those for cholam, cumbu or ragi, though cotton has a much higher net income. There is also a large and growing market for groundnut both at home and abroad.

Per Capita Production

The above analysis which suggests that the overall growth of

dry crops in terms of production is low is further evidenced by the data given in the table below :

Table showing the decline of per capita production during 1960—70

Year	Cholam	Cumbu	Ragi	Ground-nut	Cotton
1960-61	18·732	8·935	10·687	31·377	0·0111
1961-62	17·522	8·922	9·854	31·546	0·0112
1962-63	17·007	9·152	10·041	32·848	0·0101
1963-64	16·147	8·271	8·976	31·302	0·0102
1964-65	15·321	7·744	8·909	25·506	0·0099
1965-66	14·000	6·413	7·969	22·466	0·0082
1966-67	14·961	8·151	8·658	22·630	0·0090
1967-68	13·829	7·560	8·139	23·655	0·0079
1968-69	12·034	6·545	7·402	21·662	0·0066
1969-70	14·619	7·882	8·568	23·137	0·0101
Decline of per capita production in 1968-69 compared to 1960-61....	35·76	11·79	30·78	30·96	40·54

Thus the per capita production of cholam, cumbu, ragi, groundnut and cotton has declined by 35·76 per cent, 11·79 per cent, 30·78 per cent, 30·96 per cent and 40·54 per cent respectively in 1968-69 compared to the level of 1960-61. It can also be observed that the per capita production of all these crops has been declining throughout 1960-69. Though in 1969-70 some upward movement is found, the per capita production in that year is low compared to the base year (1960-61). There may be some kind of substitution and/or complementary between the selected crops in the context of uncertain rainfall to carry out timely sowings and relative prices. The relationship between cereals and millets *vis-a-vis* changing food habits and relative prices may perhaps explain in part the trend in acreage and yield of the reference crops. The testing of this hypothesis is somewhat outside the scope of this study.

A Comparison between all-India and Tamil Nadu Progress during 1950–70

The general conclusion of the preceding analysis suggests limited progress in the development of dry crops (both food and non-food

crops) in the State during 1961-70 compared to 1951-60. Its contribution to the Indian economy has not varied significantly. Its share has more or less remained the same, though in some cases it has gone up and in other cases down.

Table 9 shows that Tamil Nadu's contribution to total production of cholam has declined from 6·6 per cent of total Indian production to 4·7 per cent in 1968-69. With regard to yield per hectare, Tamil Nadu experienced a decline. The Tamil Nadu yield per hectare was 171·7 per cent of all-India's in 1950-51 and 135 per cent in 1968-69. The rate of increase in yield per hectare was higher for the country than that for the State. Tamil Nadu being already at a fairly mature level in dry farming, the scope for increase in yield per hectare has been limited.

Tamil Nadu's contribution in cumbu has fallen from 8·5 per cent of total all-India production in 1950-51 to 6·6 per cent in 1968-69. In regard to yield, the gap between Tamil Nadu and India has widened in favour of Tamil Nadu. Tamil Nadu's productivity per hectare is almost twice that of all-India productivity.

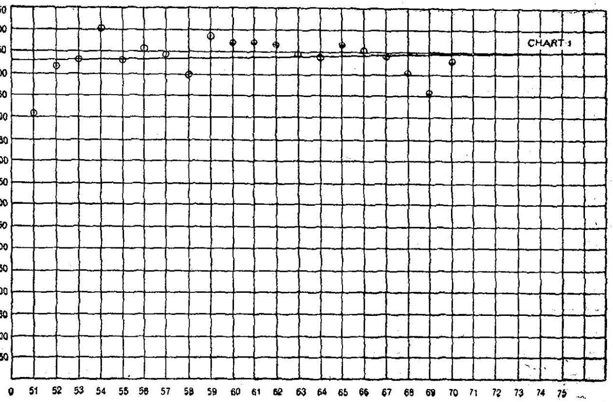
In the case of ragi, Tamil Nadu's contribution to all-India production has declined from 18·1 per cent of total all-India production in 1950-51 to 17·4 per cent in 1968-69. On yield per hectare, the position is unchanged.

With regard to cotton, Table 9 shows that Tamil Nadu's position in comparison to that of all-India has been adversely affected.

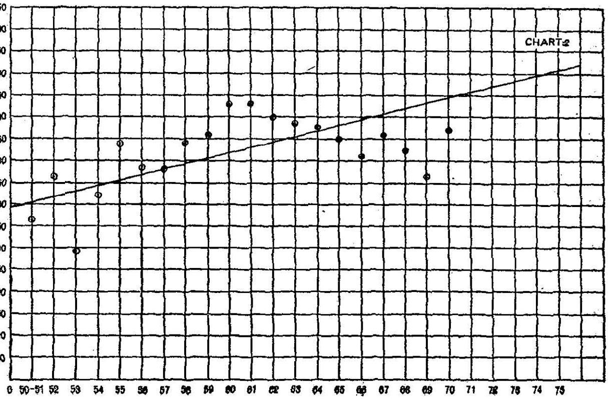
With regard to groundnut, Tamil Nadu's contribution has declined from 22·4 per cent of the total production in 1950-51 to 19·2 per cent in 1965-66 and 18·7 per cent in 1968-69. With regard to yield, Tamil Nadu's position has improved.

The reason for the decline in Tamil Nadu's contribution to all-India production of dry crops is the slower rate of growth of the area under cultivation of these crops during 1950-70. There is, however, limited scope for expanding their cultivation in order to increase output and in turn the contribution to all-India production. That objective calls for an increase in the yield per hectare for all these crops through the use of high yielding varieties. Such use of high yielding varieties will increase yield per hectare by 100 to 200 per cent as the next chapter suggests.

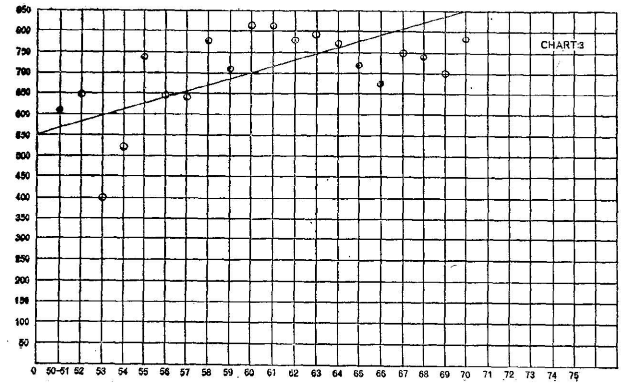
AREA UNDER CHOLAM IN TAMIL NADU DURING 1950—70 (IN '000 HECTARES)



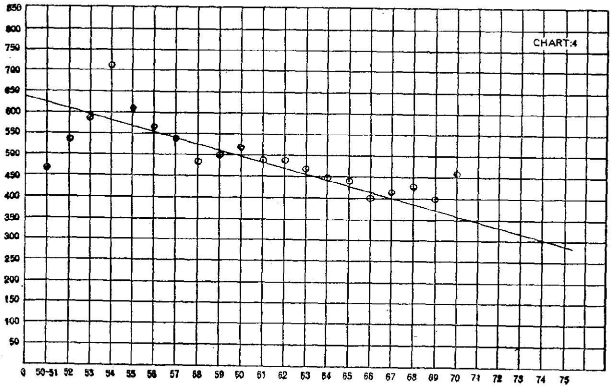
TOTAL PRODUCTION OF CHOLAM IN TAMIL NADU DURING 1950—70 (IN '000 TONNES)



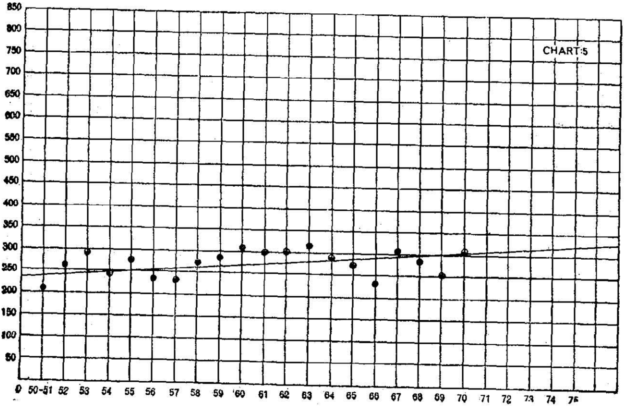
YIELD PER HECTARE OF CHOLAM (IN KG.) IN TAMIL NADU DURING 1950—70



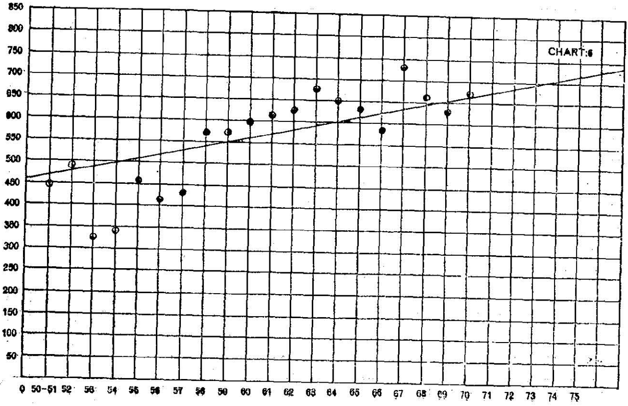
AREA UNDER CUMBU IN TAMIL NADU DURING 1950—70 (IN '000 HECTARES)



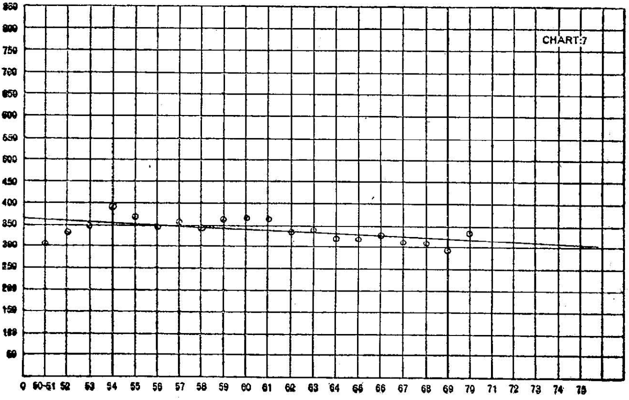
PRODUCTION OF CUMBU IN TAMIL NADU DURING 1950—70



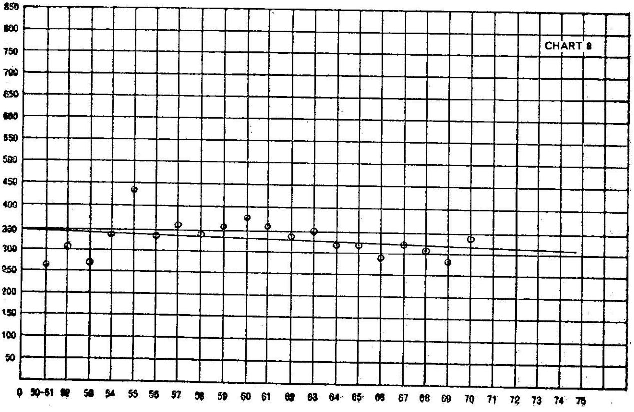
YIELD PER HECTARE OF CUMBU (IN KG.) IN TAMIL NADU DURING 1950—70



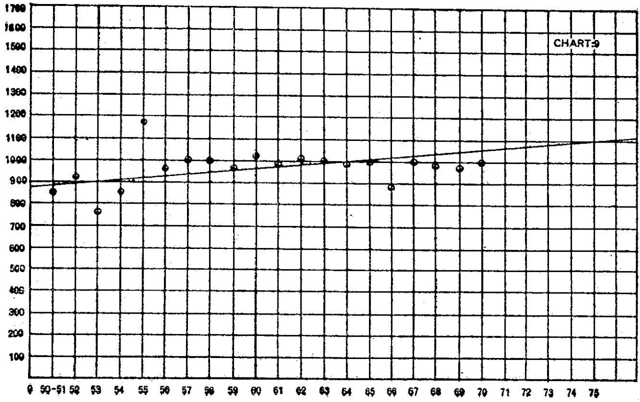
AREA UNDER RAGI IN TAMIL NADU DURING 1950—70 (IN '000 HECTARES)



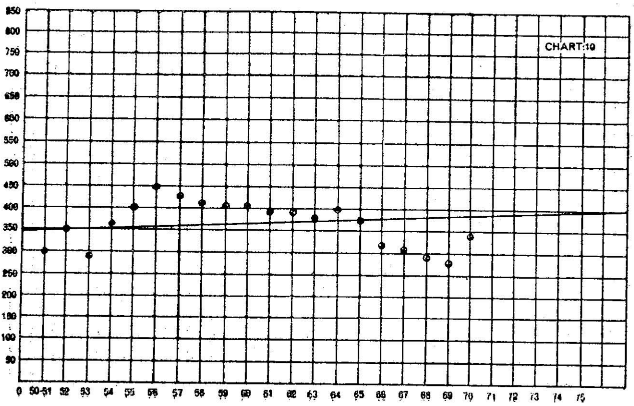
PRODUCTION OF RAGI IN TAMIL NADU DURING 1950—70 (IN '000 TONNES)



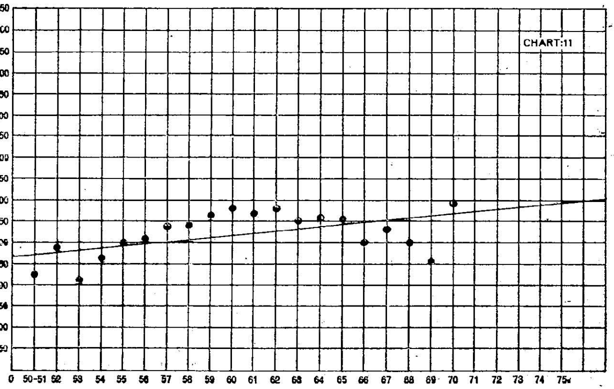
YIELD PER HECTARE OF RAGI (IN KG.) IN TAMIL NADU DURING 1950—70



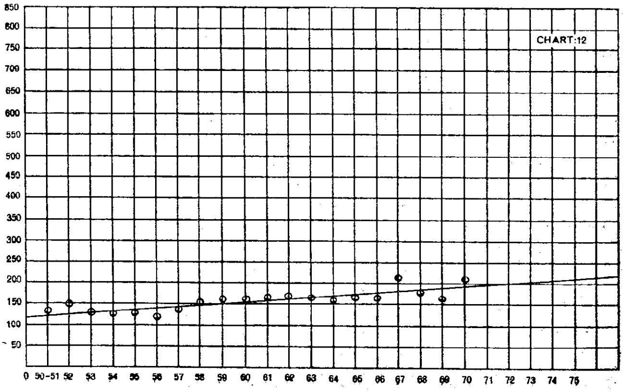
AREA UNDER COTTON IN TAMIL NADU DURING 1950—70 (IN '000 HECTARES)



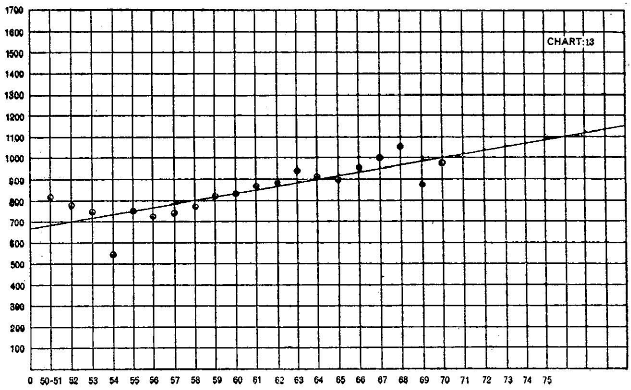
PRODUCTION OF COTTON IN TAMIL NADU DURING 1950—70 (IN '000 BALES)



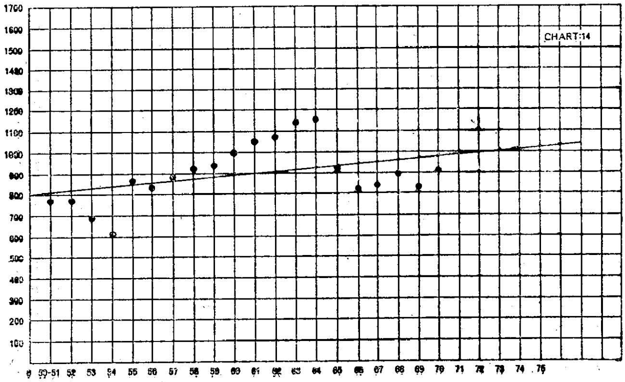
YIELD PER HECTARE OF COTTON (IN KG.) IN TAMIL NADU DURING 1950—70



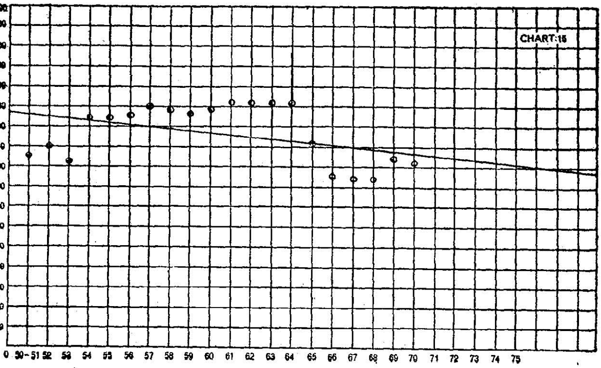
AREA UNDER GROUNDNUT IN TAMIL NADU DURING 1950—70 (IN '000 HECTARES)



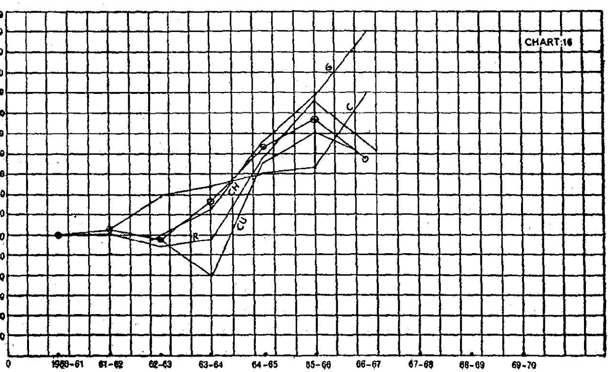
PRODUCTION OF GROUNDNUT IN TAMIL NADU DURING 1950—70 (IN '000 TONNES)



YIELD PER HECTARE OF GROUNDNUT IN TAMIL NADU DURING 1950—70



PRICE INDEX NUMBERS OF CHOLAM, CUMBU, RAGI, GROUNDNUT AND COTTON



CHAPTER II—APPENDIX 1

TABLE 1—LAND UTILISATION IN TAMIL NADU DURING 1951—1971

(in '000 hectares)

	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60	1960-61
Total area	12945	12944	12945	12939	12959	12959	12961	12959	13005	13015
Net area sown as % of total area	40·5	39·8	42·4	44·9	44·3	45·0	43·8	44·7	45·4	46·1
Net area sown	5425	5341	5718	5809	5735	5833	5673	5798	5898	5997
Area sown more than once (SMO)	932	826	1118	1130	1132	1105	1083	1121	1145	1324
Area SMO as % of total area	7·1	6·5	8·4	8·7	8·7	8·5	8·3	8·7	8·8	10·1
Gross cropped area (GCA).	6357	6167	6836	6939	6867	6938	6756	6919	7043	7321
GCA as % of total ...	47·6	46·3	50·8	53·6	53·0	53·5	52·1	53·4	54·2	56·2
Net area irrigated ...	1998	1840	2182	2153	2147	2233	2231	2260	2278	2461
Net unirrigated area sown.	3427	3501	3564	3656	3588	3600	3442	3538	3620	3536
Area irrigated more than once	474	489	592	808	810	894	761	699	701	774
Unirrigated area sown more than once	458	337	526	322	322	211	322	422	444	550
Total gross area irrigated ...	2472	2329	2774	2961	2957	3127	2992	2959	2979	3235
Total gross area unirrigated.	3885	3838	4062	3978	3910	3811	3764	3960	4064	4086

Source : Season and Crop Reports.

TABLE 1—(contd.)

	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71
Total area	13015	13016	13014	13014	13016	13011	13013	12998	13010	13009
Net area sown as % of total area	46·2	46·8	46·5	46·3	45·6	46·8	46·8	43·8	48·2	48·3
Net area sown	6017	6096	6055	6030	5934	6085	6083	5687	6267	6281
Area sown more than once (SMO)	1253	1194	1137	1145	1132	1220	1227	1032	1200	1250
Area SMO as % of total area	9·6	9·2	8·7	8·8	8·7	9·4	9·4	7·9	9·2	9·6
Gross cropped area (GCA)..	7270	7289	7192	7176	7066	7305	7309	6719	7467	7531
GCA as % of total ...	55·8	56·0	55·2	55·1	54·3	56·1	56·2	51·7	57·4	57·9
Net area irrigated ...	2502	2507	2439	2424	2399	2511	2629	2417	2476	2486
Net unirrigated area sown...	3515	3589	3616	3606	3535	3574	3454	3270	3789	3795
Area irrigated more than once	705	788	834	839	781	861	847	675	800	793
Unirrigated area sown more than once	548	406	303	307	352	359	380	357	400	457
Total gross area irrigated.	3207	3295	3268	3263	3178	3372	3476	3092	3276	3279
Total gross area unirrigated.	4063	3994	3924	3913	3888	3933	3833	3627	4191	4252

Source : Season and Crop Reports

TABLE 2—CROPPING PATTERN IN TAMIL NADU

Crops	('000 hectares) Total area under the crops			Area under each crop as % of total cropped area		
	1955-56	1960-61	1967-68	1955-56	1960-61	1967-68
Paddy	2208	2518	2660	32·15	34·39	36·4
Cholam	755	774	705	10·90	10·57	9·6
Cumbu	567	489	430	8·27	6·68	5·9
Ragi	347	364	312	5·05	4·9	4·3
Total cereals	4445	4675	4559	64·73	65·22	62·38
Total pulses	448	426	448	6·52	5·82	6·10
Total foodgrains and food crops	4893	5101	5007	71·25	71·04	68·48
Total	...	5523	5493	70·25	75·44	75·20
Cotton	450	396	294	6·55	5·41	4·00
Groundnut	726	871	1066	10·57	11·89	14·60
Total non-food crops	1974	1798	1816	29·75	24·56	24·80
Grand total cropped area	6867	7321	7309	100·00	100·00	100·00

Source : Computed from data available in Season and Crop Reports, 1955-56, 1960-61, 1967-68.

TABLE 3—UNIRRIGATED OR DRY LANDS AS PERCENTAGE OF TOTAL AREA SOWN OF DISTRICTS AND TAMIL NADU

	1958-59	1959-60	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68
Tamil Nadu ...	61·00	61·40	58·9	58·4	58·9	59·8	59·8	59·6	58·7	56·8
Chingleput ...	29·90	38·9	25·6	23·5	17·3	37·7	38·5	33·5	31·6	30·7
South Arcot ...	54·6	55·4	50·1	...	48·3	52·7	54·2	52·9	51·7	51·0
North Arcot ...	58·7	65·5	61·4	59·9	59·2	55·3	52 5	54·3	47·9	48·6
Salem	82·9	83·0	82·7	83·2	83·4	81·5	80·4	71·0	71·3	67·3
Dharmapuri ...	...	Data not available separately for these years						88·3	85·7	85·2
Coimbatore ...	66·6	66·5	63·4	63·7	63·4	65·9	65·6	65·9	68·2	63·6
Tiruchirapalli ...	73·3	73·7	72·3	66·5	70·6	70·6	70·6	71·6	70·6	68·4
Thanjavur ...	15·7	15·9	14·7	14·2	14·6	15·6	14·6	15·7	16·5	15·5
Madurai ...	67·2	66·4	64·5	66·1	67·2	69·1	66·0	67·8	66·2	63·6
Ramanathapuram	63·2	54·6	55·4	59·3	62·4	61·5	64·2	63·7	63·6	60·4
Tirunelveli ...	69·3	60·3	68·4	66·3	67·0	64·5	67·5	66·7	65·9	64·8
The Nilgiris ...	98·5	98·6	98·5	97·3	99·2	98·6	98·6	98·7	97·8	98·6
Kanyakumari ...	50·6	64·6	65·5	64·8	63·8	63·5	62·2	62·6	60·6	61·1

Source : Values computed from data in Season and Crop Reports, 1958-59 to 1967-68.

TABLE 4—UNIRRIGATED AREA AS PERCENTAGE OF CROPPED AREA FOR FIVE CROPS FOR ALL DISTRICTS IN 1966-67

Districts	Cholam	Cumbu	Ragi	Groundnut	Cotton
Chingleput	44·01	41·89	28·94	69·41	46·39
South Arcot	95·44	96·63	14·37	61·12	84·88
North Arcot	86·83	75·01	30·44	90·76	97·90
Salem	80·85	83·90	57·62	95·10	72·09
Dharmapuri	97·77	89·81	94·90	97·39	60·29
Coimbatore	80·61	72·16	27·56	89·51	47·20
Tiruchirapalli	86·37	91·61	56·87	89·24	73·20
Thanjavur	3·55	92·36	19·90	74·89	90·66
Madurai	73·60	72·41	14·48	89·08	74·40
Ramanathapuram	79·25	97·28	58·05	92·77	88·31
Tirunelveli	34·48	97·94	4·75	57·80	89·44
The Nilgiris	100	100	100	100	100
Kanyakumari	100	100	100	100	100
STATE	80·66	88·50	55·45	85·89	72·65
Total area	743147	414672	313450	993830	315698

Source : Values computed from data available in Season and Crop Reports.

TABLE 5—**PERCENTAGE DISTRIBUTION OF DRY LANDS AMONG DISTRICTS**

Districts	1961-62	1966-67	1967-68
Chingleput	2·14	2·93	2·95
South Arcot	7·81	7·98	8·27
North Arcot	8·83	7·13	7·61
Salem	19·98	8·26	7·72
Dharmapuri	...	9·46	9·80
Coimbatore	12·91	13·86	12·63
Tiruchirapalli	13·66	14·55	14·48
Thanjavur	2·37	2·79	2·70
Madurai	10·47	10·52	10·52
Ramanathapuram	9·77	10·99	11·26
Tirunelveli	8·06	8·54	9·18
The Nilgiris	1·35	1·36	1·44
Kanyakumari	2·65	1·53	1·44
STATE	100	100	100
Total area	3514225	3573844	3453990

Source : op. cit.

TABLE 6—**AREA OF CROPS IRRIGATED AND UNIRRIGATED DURING 1951-71 IN TAMIL NADU**

(in '000 hectares)

Crops	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60	1960-61
Cholam										
Area										
Irrigated	159	161	146	179	174	171	165	164	152	152
Unirrigated	558	570	656	551	581	573	532	622	619	622
Irrigated as % of total.	22·2	22·0	18·2	24·5	23·0	23·0	23·7	20·8	19·8	19·6
Cumbu										
Area										
Irrigated	74	58	91	118	112	81	64	71	65	64
Unirrigated	463	527	620	492	455	460	422	430	455	425
Irrigated as % of total.	13·8	10·0	12·8	29·3	19·8	14·9	13·2	14·1	12·4	13·1
Ragi										
Area										
Irrigated	177	190	205	189	165	173	181	181	188	180
Unirrigated	156	159	187	181	182	184	164	184	181	184
Irrigated as % of total.	53·2	54·4	52·3	51·1	47·6	48·5	52·4	49·6	50·9	49·3
Cotton										
Area										
Irrigated	71	57	69	97	105	100	103	101	110	99
Unirrigated	279	235	296	400	345	330	309	303	296	297
Irrigated as % of total.	20·3	19·5	18·9	24·1	23·3	23·3	25·0	25·1	27·1	24·9
Groundnut										
Area										
Irrigated	53	52	49	73	53	46	88	86	94	99
Unirrigated	779	744	538	753	728	742	779	733	744	771
Irrigated as % of total.	6·8	7·0	9·1	9·7	7·3	6·2	11·3	10·6	11·2	11·4

Source : Values computed from data available in Season and Crop Reports.

TABLE 6—AREA OF CROPS IRRIGATED AND UNIRRIGATED DURING 1951-71 IN TAMIL NADU—(*contd.*)

Crops	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71
Cholam										
Area										
Irrigated	145	143	142	143	159	144	156	149	150	152
Unirrigated	622	602	601	662	600	599	549	513	582	597
Irrigated as % of total.	18·9	19·1	19·1	18·6	21·0	19·3	22·1	22·5	20·5	20·3
Cumbu										
Area										
Irrigated	60	55	52	46	51	48	55	54	51	52
Unirrigated	429	416	397	394	349	367	375	348	408	438
Irrigated as % of total.	12·2	11·7	11·5	10·5	12·8	11·5	12·7	13·4	11·1	10·6
Ragi										
Area										
Irrigated	144	152	135	143	151	146	150	146	147	148
Unirrigated	192	190	185	177	178	168	162	149	189	190
Irrigated as % of total.	43·0	44·4	42·2	44·7	45·9	46·5	48·1	49·5	43·8	43·8
Cotton										
Area										
Irrigated	91	108	113	101	87	86	86	71	86	83
Unirrigated	301	268	287	276	234	227	208	211	259	247
Irrigated as % of total.	23·3	26·5	28·3	26·8	27·1	27·6	29·4	25·2	24·9	25·2
Groundnut										
Area										
Irrigated	104	106	115	103	115	140	181	128	133	139
Unirrigated	783	838	798	798	840	854	885	655	849	861
Irrigated as % of total.	11·8	11·3	12·6	11·4	12·0	9·9	17·0	14·5	13·5	13·9

TABLE 7—AREA, PRODUCTION AND AVERAGE YIELD PER HECTARE OF FIVE PRINCIPAL DRY CROPS IN TAMIL NADU DURING 1951—1971

(in '000 hectares and tonnes)

Crops	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60	1960-61
Cholam										
Area	717	731	802	730	755	744	697	786	771	774
Production	461	294	421	540	486	480	543	560	631	631
Average yield kg./ha ...	645	399	523	739	643	644	779	712	818	816
Cumbu										
Area	537	585	711	610	567	541	486	501	520	489
Production	265	294	245	279	237	235	277	288	311	301
Average yield kg./ha ...	493	326	344	458	417	434	571	575	600	616
Ragi										
Area	333	349	392	370	347	357	345	365	368	364
Production	305	269	336	436	335	357	343	354	376	360
Average yield kg./ha....	916	768	859	1177	966	1000	994	968	1020	989
Cotton										
Area	350	293	365	403	450	431	413	405	406	396
Production (Lint) ('000 bales) ...	292	213	263	300	311	339	346	366	387	374
Average yield kg./ha....	148	129	129	132	123	140	149	160	169	167
Groundnut										
Area	781	747	579	755	726	737	777	818	836	811
Production	782	694	618	867	840	884	926	942	999	1057
Average yield kg./ha. ...	1002	929	1148	1149	1158	1205	1191	1168	1193	1217

TABLE 7—AREA, PRODUCTION AND AVERAGE YIELD PER HECTARE OF FIVE PRINCIPAL DRY CROPS IN TAMIL NADU DURING 1951—1971—(*contd.*)

(in '000 hectares and tonnes)

Crops	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71
Cholam										
Area	768	745	742	767	759	743	705	662	732	749
Production	601	590	572	552	513	558	525	465	575	547
Average yield kg./ha. ...	782	796	771	720	675	751	743	703	786	730
Cumbu										
Area	489	471	449	440	400	415	430	402	459	490
Production	306	319	293	279	235	304	287	253	310	321
Average yield kg./ha ...	627	677	652	634	588	733	663	630	675	656
Ragi										
Area	336	342	321	320	329	313	312	295	336	338
Production	338	350	318	321	292	323	309	286	337	345
Average yield kg./ha ...	1007	1002	992	1001	889	1002	991	971	1002	1021
Cotton										
Area	392	376	400	376	321	313	294	282	345	330
Production (Lint) ('000 bales) ...	384	353	360	357	301	335	299	256	397	358
Average yield kg./ha ...	174	167	160	171	169	215	183	163	207	195
Groundnut										
Area	888	945	914	901	955	994	1066	883	982	1000
Production	1082	1145	1109	920	823	844	898	837	910	917
Average yield kg./ha ...	1217	1217	1217	1019	860	849	843	948	927	916

Source : op. cit.

TABLE 8—PERCENTAGE DISTRIBUTION OF AREA, PRODUCTION AND YIELD AMONG DISTRICTS OF FIVE MAJOR DRY CROPS

Districts		Area			
	Cholam	Cumbu	Ragi	Ground-nut	Cotton
Chingleput	0·18	1·05	7·79	5·24	0·26
South Arcot	5·67	10·42	6·67	15·89	0·76
North Arcot	5·43	3·36	8·85	21·51	0·21
Salem	18·45	17·35	41·04	14·23	6·39
Dharmapuri	...	...	...	...	...
Coimbatore	28·00	13·61	12·60	13·05	32·89
Tiruchirapalli	17·88	22·74	5·34	11·17	3·21
Thanjavur	0·23	0·24	1·21	2·64	...
Madurai	17·21	4·55	4·44	10·75	13·17
Ramanathapuram ...	2·47	11·29	8·67	3·85	16·36
Tirunelveli	4·47	15·39	2·96	1·39	26·70
The Nilgiris	0·01	...	0·43	...	...
Kanyakumari	...	...	...	0·28	0·25
STATE ...	100	100	100	100	100
	756116	448862	329770	920332	355575

Source : Op. cit.

TABLE 8—PERCENTAGE DISTRIBUTION OF AREA, PRODUCTION, YIELD AMONG DISTRICTS OF FIVE MAJOR DRY CROPS—(contd.)

Districts	Production				
	Cholam	Cumbu	Ragi	Ground-nut	Cotton
Chingleput	0·13	0·89	7·3	5·4	0·1
South Arcot	6·37	13·50	7·6	16·5	0·7
North Arcot	5·54	3·48	11·5	20·9	0·1
Salem	20·10	13·88	35·3	14·6	6.9
Dharmapuri	...	...	...	...	...
Coimbatore	24·90	14·58	15·6	13·2	35·6
Tiruchirapalli	14·12	24·40	4·6	10·9	3·1
Thanjavur	0·10	0·35	1·3	2·6	...
Madurai	19·80	3·52	5·2	10·5	12·1
Ramanathapuram ...	2·81	10·80	7·4	3·7	18·6
Tirunelveli	6·13	14·60	3·9	1·4	22·8
The Nilgiris	...	...	0·3	0·3	...
Kanyakumari	...	...	...	...	...
STATE	100	100	100	100	100
	558100	303910	322630	882600	334810 (bales)

Source : Op. cit.

TABLE 8—**PERCENTAGE DISTRIBUTION OF AREA, PRODUCTION, YIELD AMONG DISTRICTS OF FIVE MAJOR DRY CROPS**—(*contd.*)

Districts	Yield				
	Cholam	Cumbu	Ragi	Ground-nut	Cotton*
Chingleput	615	579	954	854	205
South Arcot	849	819	1064	854	215
North Arcot	771	671	1203	964	215
Salem	821	673	897	998	226
Dharmapuri	853	561	897	998	...
Coimbatore	679	785	1234	816	173
Tiruchirapalli	587	785	728	650	211
Thanjavur	1125	667	1079	650	318
Madurai	844	895	1347	1002	160
Ramanathapuram ...	746	674	1122	1002	149
Tirunelveli	1012	673	1459	1002	177
The Nilgiris	751	734	733	890	...
Kanyakumari	751	734	1029	890	...
STATE	751	733	1002	888	171

Source : Op. cit.

* In terms of Lint.

TABLE 9—AREA, PRODUCTION AND YIELD PER HECTARE OF FIVE DRY CROPS FOR INDIA AND TAMIL NADU

('000 hectares) ('000 tonnes)

Crops	1950-51			1955-56		
	Area	Production	Yield	Area	Production	Yield
Cholam						
All-India	15571	5495	350	17362	6726	390
Tamil Nadu	607	365	601	755	486	643
Tamil Nadu as % of all-India	3·89	6·6	171·7	4·3	7·2	165
Cumbu						
All-India	9023	2595	290	11338	3428	300
Tamil Nadu	467	209	448	567	237	417
Tamil Nadu as % of all-India	5·2	8·5	154·5	5·0	6·9	139

Ragi						
All-India	2203	1429	650	2307	1846	830
Tamil Nadu	306	259	849	347	335	966
Tamil Nadu as % of all-India	18·4	18·1	130·6	15·0	18·1	116·4
Cotton						
All-India	5882	2875	90	8086	3949	90
Tamil Nadu	299	226	135	450	311	123
Tamil Nadu as % of all-India	5·1	7·9	150	5·6	7·9	136·6
Groundnut						
All-India	4494	3481	780	5133	3862	750
Tamil Nadu	811	778	959	726	840	1158
Tamil Nadu as % of all-India	18·0	22·4	123	14·1	21·8	154·4

Source : op. cit.

TABLE 9—AREA, PRODUCTION AND YIELD PER HECTARE OF FIVE DRY CROPS FOR INDIA AND TAMIL NADU—(*contd.*)

('000 hectares) ('000 tonnes)

Crops	1960-61			1965-66			1968-69		
	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield
Cholam									
All-India	18412	9814	530	17504	7527	430	18731	9804	520
Tamil Nadu	774	631	816	759	513	675	662	465	703
Tamil Nadu as % of all-India	4·2	6·4	154	4·3	6·8	157	3·5	4·7	135
Cumbu									
All-India	11469	3283	290	11563	3655	320	12052	3802	320
Tamil Nadu	489	301	616	400	235	588	402	253	630
Tamil Nadu as % of all-India	4·3	9·2	212·4	3·5	6·4	183·8	3·3	6·6	193·8

Ragi									
All-India	2515	1838	730	2256	1176	520	2238	1648	740
Tamil Nadu	364	360	989	329	292	889	294	286	971
Tamil Nadu as % of all-India	14·5	19·5	135·5	14·6	24·2	171·0	13·1	17·4	131·2
Cotton									
All-India	7610	5293	130	7942	4762	110	7685	5270	120
Tamil Nadu	396	374	167	321	301	169	282	256	163
Tamil Nadu as % of all-India	5·2	7·1	127	4·0	3·9	153·6	3·7	4·9	135·9
Groundnut									
All-India	6463	4812	750	7428	4230	570	7091	4476	630
Tamil Nadu	871	1057	1217	955	823	860	883	837	948
Tamil Nadu as % of all-India	13·5	21·9	162·1	12·9	19·2	150·9	12·4	18·7	150

Source : Op. cit.

TABLE 10—INDEX NUMBERS OF AGRICULTURAL PRODUCTION (BASE: 1961-62=100) PRODUCTIVITY AND AREA UNDER FIVE DRY CROPS

Crops	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70
Cholam								
Area	96·1	96·3	99·5	98·5	96·4	91·4	85·8	94·9
Production	95·1	92·3	89·0	82·7	90·1	84·7	74·9	92·7
Productivity	93·1	90·1	88·1	83·2	89·1	83·8	75·4	91·4
Cumbu								
Area	94·3	89·9	88·1	80·2	83·2	86·4	80·5	92·0
Production	104·0	95·6	90·9	76·8	98·7	93·3	82·6	101·2
Productivity	101·9	94·3	90·0	77·2	97·6	92·3	83·1	99·8

Ragi								
Area ...	96·1	90·1	90·0	92·3	88·0	97·6	82·6	94·2
Production	97·7	88·9	89·6	81·6	90·1	86·4	79·8	93·9
Productivity	95·7	80·7	88·7	82·1	89·1	85·5	80·3	92·6
Cotton								
Area ...	94·5	100·5	94·5	80·7	78·7	73·8	70·7	86·7
Production	93·4	92·9	90·7	75·0	77·4	69·1	59·1	91·9
Productivity	91·5	91·6	89·8	75·5	76·6	68·3	59·5	90·6
Groundnut								
Area ...	109·3	105·7	104·2	110·5	115·0	123·4	102·1	113·6
Production	109·6	106·1	88·1	78·8	84·6	86·1	80·1	87·1
Productivity	107·3	104·6	87·2	79·3	83·7	85·2	80·6	85·9

Source : Computed from the data provided by the Season and Crop Reports and Directorate of Statistics, Tamil Nadu Government.

TABLE 11—GROSS INCOME PER HECTARE FOR FIVE DRY CROPS—1960-61 TO 1969-70 IN TAMIL NADU

(in Rupees)

Crops	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70
Gross income per hectare for										
Cholam ...	294	287	280	324	373	382	375	372	501	549
Cumbu ...	216	223	232	248	301	310	367	332	424	440
Ragi ...	351	360	342	343	489	523	501	496	653	631
Groundnut	627	647	611	703	759	746	876	813	918	1212
Cotton ...	474	514	...	565	632	643	1036	829	826	1102

Source : These values have been calculated on the basis of data obtained from the Directorate of Statistics on yield and price level for 1960-61 to 1969-70.

TABLE 12—TRENDS IN PRICES OF FIVE MAJOR DRY CROPS GROWN IN TAMIL NADU DURING 1960-61 TO 1969-70

(Per 100 kg. in Rupees)

Crop	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70
Cholam ...	36·03	36·76	35·23	41·97	51·71	56·64	50·00	50·00	71·24	69·80
Cumbu ...	35·04	35·63	34·23	28·04	47·44	52·78	50·00	50·00	67·31	65·20
Ragi	35·47	35·73	33·49	34·95	48·82	58·82	50·00	50·00	67·23	62·92
Groundnut ...	51·52	53·17	50·17	57·79	74·46	86·75	103·15	96·45	96·78	130·71
Cotton (Lint) ...	96·73	100·44	116·38	120·05	125·69	128·70	163·95	150·70	171·95	181·08

Source : Season and Crop Reports and the Directorate of Statistics, Tamil Nadu Government.

TABLE 12(a)—PRICE INDICES OF FIVE DRY CROPS (BASE: 1960-61)

Crop	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70
Cholam ...	100	102·03	97·78	116·5	143·5	157·2	138·8	138·8	197·72	193·73
Cumbu ...	100	101·7	97·7	80·0	135·4	150·6	142·7	142·7	192·10	186·07
Ragi	100	100·7	94·4	98·5	137·6	166·0	141·0	141·0	189·54	177·39
Groundnut ...	100	103·2	97·4	112·2	144·6	168·4	200·2	187·21	187·85	253·71
Cotton ...	100	103·8	120·3	124·0	129·9	133·0	169·5	155·8	177·76	187·20

Source: Season and Crop Reports and the Directorate of Statistics, Tamil Nadu Government.

CHAPTER II—APPENDIX 2

CLIMATIC AND SOIL CONDITIONS OF TAMIL NADU

The choice of crops grown in the different districts of Tamil Nadu and the methods of their cultivation vary widely. Both for a proper understanding of them and for making proposals aiming at increasing agricultural production by intensive cropping, extending cultivation to new areas, introducing new crops and techniques and taking precautions against pests and diseases, it is necessary to consider the climatic, physiological and soil characteristics, and their interdependence and interactions.

The purpose of this section is not to give an analytical exposition of climatic and soil conditions of Tamil Nadu in relation to their effect on cropping pattern, methods of cultivation, etc., but to indicate their importance often left unnoticed in economic discussion of farming. As such only a brief description about climatic and soil conditions of Tamil Nadu, and how these affect cropping patterns, methods of cultivation will be attempted in order to allow for some of the non-economic variables which act as external constraints in analysis, discussion, proposal, policy or programme related to Tamil Nadu agriculture. No crop planning can succeed which does not take into account these external constraints.

Climate

Rainfall is the major climatic factor on which the cropping pattern of the dry farming areas depends. Tamil Nadu receives rain, four times in a year through

(1) Rainfall during South-West monsoon period (June-September);

(2) Rainfall during North-East monsoon period (October-December);

(3) Rainfall during winter period (January-February) and

(4) Rainfall during hot-weather period (March-May).

Tamil Nadu gets a major proportion of its rainfall during the year from the South-West and North-East monsoons. Normally they contribute 80 per cent of the total rainfall in a year. This is evident from the data included in this appendix.

South-West Monsoon

The South-West monsoon which is the lifeblood of agriculture in most parts of India spends its fury from June to September to the West of the Western Ghats in the Kerala State and its incidence in the various districts of Tamil Nadu depends upon local topography, distance and location with reference to the Western Ghats and their gaps. For instance, in Dharapuram which lies immediately opposite to the Palghat gap, the wind is furious during June and July and the dust penetrates everywhere. But there is very little rain. The rainfall from this monsoon is heaviest in the Nilgiris, the Anamalais and the Palanis amounting to an average of about 1000 mm. to 1200 mm. in 50 rainy days, though in places the rainfall exceeds even 5000 mm. In parts of Coimbatore, Salem, North Arcot, Chingleput and South Arcot districts which lie to the South West of the Madukarai gap in the track of the monsoon winds, the rainfall is fairly heavy ranging from 375 mm. to 450 mm. spread over 20 to 30 rainy days. Areas to the south of this like Thanjavur and Tiruchirapalli districts get 270 to 300 mm. spread over 15 to 20 rainy days. In regions further to the south like Tirunelveli, Ramanathapuram and parts of Madurai and Coimbatore districts where the moisture-laden clouds are completely cut off by the Western Ghats, the rainfall from the South-West monsoon is less than 250 mm.

North-East Monsoon

Unlike the other States of India, Tamil Nadu gets the full benefit of the retreating South-West monsoon which brings in its wake the moist winds passing over the Bay of Bengal. The incidence of the North-East monsoon from October to December diminishes with the distance from the east coast and nearness to the Western Ghats. The rainfall is heaviest in the coastal districts of Madras, Chingleput, South Arcot and Thanjavur which get the direct impact of the monsoon and ranges from 600 to 800 millimetres in 20 to 30 rainy days. In other districts which lie further away along the track of the monsoon like Madurai, Ramanathapuram, Tirunelveli, North Arcot and Tiruchirapalli, the rainfall is somewhat less, the

average being 370 mm. to 500 mm. spread over 15 to 25 rainy days. The western-most districts of Salem, Coimbatore and the Nilgiris get about 250 mm. to 300 mm. in a period of 20 rainy days.

Winter and Hot Weather Period

Rainfall during these periods is low and scattered. Normally Tamil Nadu receives 700 mm. to 800 mm. from winter period rainfall and 325 mm. to 350 mm. during hot weather period.

The South-West monsoon plays an important part in the rainfed tracts of the Northern districts of the State and in securing adequate supply to the rivers which water the wet lands. The dry crops of the Southern districts and most of the small irrigation tanks, however, depend on the North-East monsoon.

On the basis of the rainfall that a district receives, the districts can be divided into 6 groups.

Range of Rainfall in millimetres		*District*
Below 800	...	Coimbatore,
800-1000	...	Tirunelveli, Ramanathapuram, Madurai, Salem, Dharmapuri, North Arcot and Tiruchirapalli,
1000-1200	...	Thanjavur and South Arcot,
1200-1400	...	Madras and Chingleput,
1400-1800	...	Kanyakumari,
Above 1800	...	The Nilgiris.

Source: Basic Agricultural Statistics 1970, Tamil Nadu, issued by the Directorate of Statistics, Tamil Nadu.

Soils of Tamil Nadu

The soils in Tamil Nadu can be divided into the following major groups, namely, Black Soil, Alluvial Soil, Laterite Soil and Red Soil. They can further be divided as follows:

(1) *Black Soil:*

(*a*) Calcareous.
(*b*) Gypsiferous.

(2) *Alluvial Soil :*

(*a*) Sandy coastal alluvium.
(*b*) River alluvium.

(3) *Laterite Soil :*

(*a*) High level laterite.
(*b*) Low level laterite.

(4) *Red Soil :*

(*a*) Ferruginous red loam.
(*b*) Ferruginous red sterile soil.
(*c*) Ferruginous red sandy soil.
(*d*) Ferruginous shallow red soil.
(*e*) Ferruginous deep red loam.

The largest area in the State is occupied by the Red Soil.

(1) *Black Soils :* These are also called Black cotton soils. Black soils occupy a total area of about 27 lakh hectares and are found in all districts excepting the hill regions like The Nilgiris. The soils are dominant in the districts of Ramanathapuram and South Arcot where they contribute 61 per cent and 45 per cent respectively of the total cultivable area. These soils are clayey in nature. They absorb water very slowly, but once absorbed, they are capable of retaining the moisture for a long time.

The black soils found in this State are medium to deep. These soils swell while absorbing moisture and shrink while drying up, resulting in wide and deep cracks. If it rains at this time the soil may immediately absorb a large portion of rain water but when once the soil is saturated, it prevents further infiltration. As a result, a large portion of rainfall stagnates on the surface and slopes down the surface as surface run-off. It also carries with it a large quantity of eroded soil. Therefore, the dry farming measures to be adopted in these areas should be such as to retain the water on the surface for a long time. At the same time it should prevent over stagnation which will impede the crop growth.

(2) *Red Soils :* This soil is generally shallow in depth, low in soluble salts and poor in plant nutrients. This soil is capable of growing almost all crops under irrigation. Under rainfed condition, the farmers grow such crops which supply them grain for their staple

food like cholam, cumbu, ragi. On these soils pulses like Redgram, Bengalgram and oil seeds like groundnut and gingelly are grown either singly or mixed with other crops. Though these soils are poor in organic matter, they absorb water easily. Very frequent rainfall is necessary for successful growth on these soils since the water-holding capacity of these soils is low. As the frequency of the rainfall and the distribution is not even, it is necessary to adopt intensive dry farming measures to conserve as much rain water as possible in order to make these soils productive. These soils are found in almost all dry farming regions.

(3) *Alluvial Soils :* They are mainly found in coastal or deltaic areas and cultivation is carried on only under irrigated conditions.

(4) *Laterite Soils :* They are mostly found in hilly areas and they are not found in dry areas.

The extent of the area of major soils are as follows (in hectares):

Black soil	27,10,300
Red and Laterite soil	59,00,000
Alluvial soil	2,15,800.

CHAPTER II—APPENDIX 3

COMMON DRY CROPS OF TAMIL NADU

The purpose of this appendix is to discuss briefly some of the main characteristics of the five major dry crops of Tamil Nadu, viz., Cholam, Cumbu, Ragi, Groundnut and Cotton.

Cholam

Botanical name :	Sorghum vulgare.
Normal area :	756,000 hectares.
Varieties :	Numerous.

The Agricultural Department has evolved 23 strains of cholam mostly at the Coimbatore Breeding Station. The popular types are:

(1) *For July-August sowing :*

(*i*) Peria manjal cholam for Coimbatore, Salem and Madurai ;

(*ii*) Thalai virichan cholam for Coimbatore, Salem, Tiruchirapalli and parts of North Arcot ; and

(*iii*) Co-ordinated Sorghum hybrids 2 and 3 for the entire State.

(2) *For March sowing :*

(*i*) Vellai cholam for Madurai, Tirunelveli and Ramanathapuram;

(*ii*) Kesari vellai cholam for Coimbatore, Salem and Tiruchirapalli ; and

(*iii*) Ennai vellai cholam for Coimbatore.

(3) *For January-March sowing :*

Mottai vellai cholam for Coimbatore and Tiruchirapalli.

Seed Rate :	4 kg. per acre under dry areas;
	6 kg. to 12 kg. under irrigated conditions.
	30 to 35 kg. for fodder,

Volume weight :	1 M.M. weighs 1·2 to 1·6 kg.
Husk to grain :	12 to 18 per cent.
Weight of seed :	1,000 seeds weigh 20 to 35 gm.
Number of seeds in one kg. :	30,000 to 55,000.
Germination capacity :	90 to 95 per cent.
Yield :	Dry—550 kg. per hectare. Wet—1,200 kg. per hectare.

The duration for cholam varies from 75 days to 105 days and its height ranges from 2 ft. to 15 ft. Cholam stalk and straw are considered to be nutritious cattle fodder but in the early stages of its growth, many of the dry land varieties are poisonous because of the high content of cyanogenetic glucosides. But this poison disappears at the flowering stage. Some varieties are grown essentially for fodder like the "Irungu" (Sorghum dochna), the grains of which are mostly used for seed purposes.

On dry lands the crop is sown in two seasons, the Kar crop sown in May to July and reaped 3 to 4 months later and the Paruvam crop sown in October-November and reaped in February. The Kar crop is generally grown as a mixture.

When cholam is raised in lines behind the furrow, the optimum spacing between lines ranges from 15 to 16 inches. Experiments at Kovilpatti have shown no significant difference in yields between line sowing and broadcasting. But line sowing facilitates subsequent operations like weeding and harvesting.

The cholam crop is cut four inches to six inches above ground level by the sickle and after harvest the stalks are stacked in the field and taken to the threshing floor whenever convenient.

The chief insect pest of cholam is the cholam ear-head bug (Calacoris angustatus) which affects chiefly the irrigated crop. The period of virulent infestation is in the middle of May and if the grains harden by this time, the crop escapes damage completely. The farmer, therefore, prefers to sow cholam before the middle of March. The grain smut (Sphacelotheca Sorghi) is the most important disease affecting cholam and being seed-borne can be completely controlled by pre-treating the seeds with sulphur. Striga is a root parasite of cholam and the Agricultural Department has evolved one variety (Cozo) resistant to striga by using as parents resistant varieties from Africa. Recently

the early shoot fly (Atherigona Indica) has become a serious pest, affecting the early seedlings. It can, however, be controlled by the application of thimet at 1·5 gm. per metre length (37·5 kg. per hectare) at the time of sowing.

Cumbu

Botanical name :	Pennisetum typhoidum.
English name :	Bulrush or spiked millet or pearl millet.
Normal area :	448,862 hectares.
Varieties :	There are long and short duration varieties. The long duration varieties are generally grown on dry lands in the monsoon season and the short duration varieties under irrigation in the hot weather. As a dry crop it is generally grown on soils of poor fertility, except in Ramanathapuram and Tirunelveli districts where it is the main grain-crop on black soils.
Seed rate :	Dry land : 1½ kg. in black soils ; 3 to 5 kg. in others.
Irrigated :	1½ kg. transplanted, from nursery ; 4½ kg. if sown broadcast.
Weight of seed :	1000 seeds weigh 4·5 to 5 grams.
Husk to grain :	10 per cent by weight.
Germination capacity :	90 to 95 per cent.
No. of seeds in 1 kg.	2,00,000 to 2,25,000.
Yield :	Dry land : 600 kg. per hectare.
Irrigated :	1500 kg. per hectare.

Cumbu is raised both as a pure crop and as a mixture and it does not require any careful preparatory cultivation. The crop matures in four to five months. Conservation of rainfall by bunding dry fields has not improved the yields of cumbu at the Kovilpatti Experimental Farm.

The cumbu crop requires careful watching from the time of grain formation as birds are very fond of the grains. Cumbu straw is considered to be bad for cattle and the stalks are used for thatching or as fuel.

Ragi

Botanical name :	Eleusine Coracana.
Normal area :	329,770 hectares.
Varieties :	There are distinct varieties for dry and irrigated lands, and for early and late seasons. Ragi is grown as a dry crop in the uplands of Salem, Coimbatore and in some districts it is raised in irrigated lands. The varieties differ in the nature of the grain as open, top currend, etc.
Seed rate :	2 kg. to raise seedlings in a nursery. 5 kg. on dry lands.
Husk to grain :	5 per cent by weight.
Weight of seed :	1,000 seeds weigh 2·5 grams to 3 grams.
Germination capacity :	90 to 95 per cent.
Yield :	On dry lands : 800 kg. per hectare. On wet lands : 1,800 kg. per hectare.

The duration of the crop is four months. Ragi straw is considered to be nutritious for cattle when ensilaged.

Commercial Crops—Groundnut

Groundnut is the most important oil seed of Tamil Nadu.

Botanical name :	Arachis hypogea.
Tamil :	Verkadalai, Nilakkadalai, Manilakottai.
Normal area :	920,332 hectares.
Season :	Groundnut is largely raised as a rainfed crop, sowing being done with the first rains of the South-West monsoon and harvest comp-

leted by November-December. It is also grown to a limited extent in summer (February-March to June-July) in certain districts like South Arcot where facilities for irrigation exist.

Varieties : The varieties usually cultivated are classed as the spreading, semi-spreading or the bunch according to their habits of growth. The spreading varieties require 4½ months for maturity, the semi-spreading 4 months and the bunch varieties mature in 3½ months. The Agricultural Department has evolved 11 improved varieties: three spreading types TMV-1, TMV-3 and TMV-4; three semi-spreading types TMV-6, TMV-8, and TMV-10; five bunch types TMV-2, TMV-5, TMV-7, TMV-9 and POL-1. Of these the most popular ones are TMV-1, TMV-3, TMV-8, TMV-10, TMV-2, TMV-7, TMV-9 and POL-1. TMV-1 is drought resistant, TMV-3 is easier for harvesting, TMV-4 is suitable for summer cropping, TMV-7 and TMV-9 are good dormant bunches, TMV-10 and POL-1 have high yield, large seed and are suitable for export.

The average oil-content of the groundnut kernel is 50 per cent—the summer produce contains about three per cent more oil than the winter produce.

Yield per hectare : Rainfed : 1,200 kg. for bunch; 1,500 kg. for spreading.

Irrigated : 2,600 kg. for bunch ; 2,000 kg. for spreading.

Points to be remembered :

(1) Harvest the crop only when it is completely mature.

(2) Dry the produce thoroughly before storing.

(3) For long-term storage, storing in the form of pods is better than storing in the form of kernels.

Uses : Groundnut kernel is rich in vegetable proteins and contains certain vitamins and is considered a good supplementary article of diet. Groundnut cake is an excellent cattle food and forms a good organic nitrogenous manure.

Cotton

Botanical name :	Gossypium Spp.
Normal area :	352,135 hectares.
Normal yield per hectare :	Irrigated : 500 kg. (Lint) Unirrigated : 100 kg. (Lint).

The chief commercial varieties of cotton grown in Tamil Nadu are the Cambodia which includes Rajapalayam and the Tinnies which include the Karunganni.

The Cambodia is mainly raised on red loams in the Central and Southern districts in two different seasons. The cold weather crop grown in September-October consists of the rainfed and irrigated cottons. While the summer crop is raised under irrigation from March to September mainly in the districts of Ramanathapuram, Madurai and Tirunelveli, sowing is done in October-November with the break of the North-East monsoon and the Tinnies zone comprises the entire black soil tract to the south of Tiruchirapalli. To suit the entire Tinnies and Karunganni areas, a cosmopolitan variety, K-7, has been evolved. The staple length of K-7 is 31/32 inches and the spinning value is 34s H. S. C.

The Cambodia is an exhausting crop and heavy manuring of the field is essential. The manure applied to dry land is five cart-loads per acre, but wet land and garden land are very heavily manured with farmyard manure and silt. Experiments have shown that garden lands of high fertility do not respond to the application of chemical fertilizers, nitrogenous or phosphate, but a satisfactory result is obtained with nitrogenous fertilizers on less fertile lands. The seed rate is about 11 kg. per hectare.

Cotton seed is prepared for sowing by rubbing it with a paste of cow-dung and mud so that the fuzz clings to the seed and the seed is then dried in the shade. The general practice is to sow the seeds in lines of 2½ to 3 feet apart, the distance between plants in the line depending upon whether the crop raised is pure or mixed, the fertility of the soil, level of manuring and availability of irrigation. Early sowing of winter Cambodia is important, otherwise the yield will be greatly reduced.

The common rotation in the black soil area is cholam, cotton, cumbu and cotton. The cotton crop that follows cholam gives invariably a reduced yield and experiments have shown that the adverse effect of cholam on cotton can be got over by growing indigo along with cholam, and for this purpose 11 kg. of indigo seeds are sown per hectare.

The important pests of cotton are the boll worm and the stem weevil. The ordinary methods of pest control have not been effective because of the wide distribution of these pests and their internal feeding habits. Eradication is, however, possible by removing the cotton crop completely when the harvest is complete in July-August. The important disease affecting cotton is the blackarm, a seed-borne disease. Primary infection of this can be controlled by dressing the seeds with ceresan or agrosan.

CHAPTER III

ECONOMICS OF CULTIVATION OF FIVE MAJOR DRY CROPS—TRADITIONAL AND HIGH YIELDING VARIETIES

THE objectives of this chapter are :

(*i*) to estimate the cost of cultivation of traditional and high yielding varieties of five major dry crops namely Cholam, Cumbu, Ragi, Cotton and Groundnut per hectare in dry areas;

(*ii*) to study the differential yield rates of traditional and high yielding varieties per hectare in dry areas ; and

(*iii*) to make an economic evaluation of high yielding varieties in comparison with traditional varieties, in terms of cost of cultivation per hectare and per kilogram of produce, yield per hectare and return per hectare, per rupee invested and per kilogram of produce.

Costs of Cultivation of Dry Crops

Accurate and reliable data on cost of cultivation of dry crops of different varieties are essential for the purposes of planning and for formulating development programmes, for increasing production, for fixing prices and particularly in this context to study the relative profitability of different varieties, namely Traditional and High Yielding Varieties.

Sources of Data

The costs of cultivation per hectare of five dry crops are based on the "Cost of Cultivation" survey conducted by the Statistics Department of the Government of Tamil Nadu during 1966-67 in dry areas of all the districts of Tamil Nadu (except the Nilgiris which as indicated earlier is not a dry area). As the programme for introducing high yielding varieties for these five dry crops has just started, no more recent data is available on their cost of cultivation. The cost of cultivation

calculated here uses as its base the "package programme" suggested by the Agricultural Department of the State Government.*

Components of Cost of Cultivation

The main components of cost of cultivation are human labour cost, bullock labour cost and material costs including seeds, manures, implements, fertilizers and pesticides. In the calculation of cost of cultivation, land-tax costs are not taken into account. The cost of owner supplies of materials and labour is not included because of the problems of imputing value. It may, however, be noted that though the exclusion of these elements may make some difference to the cost of cultivation of traditional varieties, they will not make a significant difference in the case of high yielding varieties. Most of the inputs for such varieties have to be obtained from outside and even the family labour is likely to constitute only a fraction of the total labour requirements. Further because of multiple variability, depreciation and interest charges are also excluded from the scope of this enquiry.

Traditional Varieties

The costs of cultivation per hectare for five major dry crops are given in Table 1 in Appendix 1 of this chapter.

Cholam : The cost of cultivation per hectare of Cholam works out at Rs. 304·15 for the State. Of this Rs. 149·19 is the human labour cost for ploughing, weeding and harvesting, Rs. 64·90 is bullock labour cost and Rs. 90 towards costs of materials. Thus human and bullock costs account for 70 per cent of the cost. There are wide inter-district variations in the cost of cultivation of cholam per hectare in the State. It ranges from Rs. 253·90 in South Arcot to Rs. 376·80 in Salem. This variation is due to the existence of different techniques and traditions of cultivation.

Cumbu : The cost of cultivation for Cumbu works out at Rs. 237·52 per hectare for the State as a whole of which 68 per cent is constituted by human and bullock labour and the rest, 32 per cent, by farm materials. It varies from Rs. 210·60 in Ramanathapuram to Rs. 299·11 in Chingleput.

Ragi : The cost of cultivation of Ragi per hectare works out at Rs. 420·30 for the State of which Rs. 273·23, (i.e., 65 per cent of the

* The cost of cultivation per hectare for Cumbu and Cotton are given in the "Integrated Dry Land Agricultural Development Project", Action Programme, 1970-71.

total cost) is spent on human and bullock labour. The cost of cultivation per hectare varies from Rs. 264 in Tiruchirapalli to Rs. 567 in Tirunelveli. The wide difference in cost is due mainly to high expenditure incurred no materials in Tirunelveli.

Groundnut: The cost of cultivation per hectare for groundnut works out at Rs. 580·54 for the State. Of this Rs. 300 is incurred on human and bullock labour, which constitutes 51 per cent of the cost. The cost of production varies from Rs. 493 in Tiruchirapalli to Rs. Rs. 758·44 in Madurai. Here too the inter-district difference in cost is mainly due to wide differences in the cost of materials.

Cotton: The cost of cultivation per hectare for Cotton works out at Rs. 481·86. But it varies from Rs. 422·59 per hectare in Tirunelveli to Rs. 571·76 per hectare in Madurai. More than 66 per cent of the cost is due to expenditure on human and bullock labour. The causes for inter-district cost variations are differences in wages, amount of inputs used and cultivation practices.

High Yielding Varieties*

From Table 2 of Appendix 1 of this chapter, it can be seen that the cost of production of the high yielding variety of dry crops per hectare is high, compared to the cost of production of the traditional varieties.

The cost of production of cholam per hectare works out to Rs. 505 for high yielding varieties (HYV's) which is higher than the cost of cultivation of traditional varieties by Rs. 201, i. e., 66·12 per cent higher. Of the total cost of production 58·5 per cent is accounted for by fertilizers, seeds and pesticides which form only 30 per cent of cost of cultivation under traditional varieties.

The cost of cultivation for cumbu works out to Rs. 460 per hectare for HYV's compared to Rs. 237·52 under traditional varieties, showing an increase of 93·3 per cent per hectare. Of this, materials cost accounted for 56·7 per cent of the total cost, compared to the equivalent 32 per cent under traditional varieties.

The cost of production of ragi under HYV is Rs. 505 per hectare compared to Rs. 420·30 under the traditional variety. Thus there is an increase of 20·2 per cent in the cost of cultivation per hectare.

With regard to cotton and groundnut the cost of cultivation per hectare for HYV's works out to Rs. 705 and Rs. 755 respectively.

* "The package of practices" upon which the cost of cultivation of HYV's of five dry crops is based, is given in Appendix 2 to this Chapter.

They represent an increase of 46·3 per cent and 20·2 per cent over the cost of cultivation under traditional varieties.

Thus a farmer going in for HYV's has to incur an additional cost of Rs. 201 per hectare for cholam, Rs. 222·50 per hectare for cumbu, Rs. 85 in the case of ragi, Rs. 175 in the case of groundnut and Rs. 223 in the case of cotton.

Yield per Hectare

The yield per hectare under High Yielding Varieties has been found to be significantly higher than the yield per hectare under traditional varieties. The yield per hectare (unirrigated) for cholam under traditional variety is 550 kg. compared to the yield of 1500 kg. under HYV. The HYV yield is nearly three times that of the traditional variety. For cumbu the yield is still higher. Its yield per hectare under traditional variety is 600 kg. compared to 2000 kg. under HYV. The HYV yield is 3·33 times that of the traditional variety. For ragi, the respective yields per hectare for traditional and HYV are 800 kg. and 1500 kg. The HYV yield is 1·88 times that of traditional. For groundnut the respective yields are 620 kg. and 950 kg. The HYV yield is 56·4 per cent higher than the traditional yield. For cotton, the respective yields are 450 kg. and 1000 kg. per hectare. The yield per hectare of HYV is 2·22 times that of traditional variety.

Thus for all the five crops the yield per hectare for HYV is much higher than that for traditional variety. HYV gives an additional yield of 950 kg. per hectare for cholam, 1400 kg. per hectare for cumbu, 700 kg. per hectare for ragi, 330 kg. per hectare for groundnut and 550 kg. per hectare for cotton.

An Economic Evaluation of High Yielding Varieties

The superiority of HYV's over the traditional varieties can be established in terms of—

(i) yield per hectare ;
(ii) gross income per hectare ;*
(iii) net income or profit per hectare ;
(iv) cost of production per kilogram of produce ;
(v) profit per kilogram of produce ; and
(vi) profit per rupee expended on cultivation.

The higher yield per hectare under HYV for all five dry crops as compared to the traditional varieties is indicated above.

* Gross income per hectare is arrived at by multiplying the gross yield per hectare by the price per unit of produce.

HYV's yield a much higher gross income per hectare than the traditional variety for all crops. This is evident from Table 3 in Appendix 1 to this chapter. In the case of cholam, the gross income for HYV is Rs. 1050 per hectare compared to Rs. 385 per hectare for traditional varieties. The HYV gross income is 2·73 times that of the traditional variety. For cumbu, the HYV gross income per hectare is 2·79 times that of the traditional variety. For ragi, it is 1·88 times that of the traditional variety. For groundnut and cotton the gross income per hectare for HYV is 1·55 times and 2·61 times that of the traditional varieties.

Net incomes per hectare for the five dry crops under HYV's are much higher than those for traditional varieties. Cholam, cumbu, ragi, groundnut and cotton yield 6·81 times, 4·05 times, 4·7 times, 2·2 times and 4·56 times the net returns that are obtained under their traditional varieties. (Refer Table 3 of Appendix 1 to this Chapter.)

The cost of production per kilogram of produce for all five dry crops is lower for HYV's. The cost of cultivation of cholam per kilogram is 34 Paise for HYV's compared to 55 Paise for the traditional variety. For cumbu, the respective costs of production per kilogram for HYV and traditional varieties are 23 Paise and 40 Paise respectively. For Ragi, the respective cost of production per kilogram are 34 Paise and 53 Paise for HYV and traditional varieties. For groundnut, the costs of production per kilogram under HYV are 79 Paise compared to 94 Paise under the traditional variety. For cotton the respective figures are 71 Paise and Rs. 1·07 respectively. (Table 3, Appendix 1 to this Chapter.)

It follows from the above that both the profit per kilogram of produce and the profit per rupee invested is higher for HYV's than for traditional varieties. The profit per kilogram of produce for cholam is 36 Paise for HYV compared to 15 Paise for the traditional variety. Profit per rupee invested is Rs. 1·08 for HYV and 26 Paise for the traditional variety. For cumbu, the profit per kilogram of produce and per rupee invested are 42 Paise and Rs. 1·40 respectively for HYV compared to 25 Paise and 66 Paise for the traditional variety. For ragi, the profit per kg. and per rupee are 29 Paise and 93 Paise for HYV compared to 12 Paise and 24 Paise respectively for the traditional variety. For groundnut, the profit per kg. of produce and per rupee for HYV are 51 Paise and 66 Paise compared to 36 Paise and 39 Paise for the traditional variety. For cotton, the profit per kg. of produce

and per rupee invested for HYV's are Rs. 1·09 and Rs. 1·84 respectively compared to 73 Paise and 59 Paise for the traditional variety.

In making these computations, no allowance has been made for the built-in uncertainty in dry farming, following largely from the climatic factor. An appropriate rate of discount against such risk must be allowed for in computing the real rate of return from dry farming—whether employing traditional or high yielding varieties.

Average Additional Cost per Hectare for HYV's Dry Farming

It has been noted that the cost of production per kilogram of HYV produce is lower than that for traditional variety. But because the yield per hectare for HYV is high compared to that of the traditional variety, the cost of cultivation per hectare of HYV is higher than the cost per hectare for the traditional variety. What is this additional cost per hectare of HYV ?

On the basis of the cost of production per hectare worked out for the five dry crops in Tables 1, 2 and 3 of Appendix 1 to this chapter, it can be seen that for Cholam, Cumbu, Ragi, Groundnut and Cotton the farmer has to incur an additional cost of Rs. 201, Rs. 222, Rs. 85, Rs. 175 and Rs. 223 per hectare respectively. Thus on an average, a dry farmer will incur an additional cost of Rs. 200 per hectare.

In the next chapter it is proposed that this additional cost be met with the help of the Government, working through the institutional financial agencies. In the initial stage, the Governmental responsibility as far as dry lands are concerned is to help convert them into HYV cultivating lands by directly meeting the additional cost to the farmer through credit supply in cash and kind. Those who are thus benefited in the initial year by such Governmental credit assistance will have to depend for financing the continuing cultivation of HYV's in the subsequent years on the other credit agencies such as co-operative and commercial banks. In this way the initial credit resources provided by the Government will act as a kind of rolling capital for the dry farming programme. And it is further proposed that 60 per cent of the credit should be in the form of kind so that problems of availability of materials like fertilizers, insecticides, pesticides, seeds and manures can be reduced and there be some assurance that farmers utilise the credit for productive purposes. 40 per cent is for the purpose of meeting other farm expenses, where cash payments cannot be avoided, such as in payment of wages.

CHAPTER III—APPENDIX 1

TABLE 1—COSTS OF CULTIVATION OF FIVE DRY CROPS PER HECTARE

CHOLAM (in Rupees)

Districts	Human labour	Bullock labour	Materials	Total cost
(1)	(2)	(3)	(4)	(5)
Chingleput	...	...	...	...
South Arcot	140·85	53·84	59·23	253·92
North Arcot	...	...	...	...
Salem	187·13	63·92	125·75	376·80
Dharmapuri	166·27	54·02	74·20	294·49
Coimbatore	138·94	55·89	163·95	358·79
Tiruchirapalli	133·78	65·21	70·35	269·34
Thanjavur	...	...	...	...
Madurai	137·49	80·83	83·98	302·30
Ramanathapuram ...	120·98	73·07	77·74	271·79
Tirunelveli	168·10	72·43	65·28	305·81
The Nilgiris	...	...	...	...
Kanyakumari	...	...	...	...
State Average	149·19	64·90	90·06	304·15

TABLE 1—(*contd.*)

CUMBU (in Rupees)

Districts	Human labour	Bullock labour	Materials	Total cost
(1)	(2)	(3)	(4)	(5)
Chingleput	157·75	71·85	69·51	299·11
South Arcot	141·46	49·91	42·66	234·03
North Arcot	...	...	...	...
Salem	...	...	...	...
Dharmapuri	95·97	38·77	80·55	215·29
Coimbatore	61·16	40·77	142·90	244·83
Tiruchirapalli	133·78	65·18	45·54	244·50
Thanjavur	...	...	...	...
Madurai	67·96	67·96	84·01	219·93
Ramanathapuram ...	74·94	56·22	79·47	210·63
Tirunelveli	99·38	65·95	66·54	231·87
The Nilgiris	...	...	...	...
Kanyakumari	...	...	...	...
State Average	104·05	57·08	76·39	237·52

TABLE 1—(*contd.*)

RAGI (in Rupees)

Districts	Human labour	Bullock labour	Materials	Total cost
(1)	(2)	(3)	(4)	(5)
Chingleput	229·11	64·07	137·04	430·22
South Arcot	...	...	...	...
North Arcot	242·00	102·89	202·15	556·94
Salem	219·75	53·52	182·51	455·78
Dharmapuri	184·63	47·91	72·35	304·89
Coimbatore	163·93	52·85	194·17	410·95
Tiruchirapalli	159·50	55·65	48·92	264·07
Thanjavur	...	...	...	...
Madurai	279·42	98·35	141·76	519·53
Ramanathapuram ...	145·39	54·90	72·87	273·16
Tirunelveli	196·44	98·84	271·91	567·19
The Nilgiris	...	...	...	...
Kanyakumari	...	...	...	...
State Average	203·24	69·99	147·07	420·30

TABLE 1—(*contd.*)

GROUNDNUT (in Rupees)

Districts	Human labour	Bullock labour	Materials	Total cost
(1)	(2)	(3)	(4)	(5)
Chingleput	192·51	52·66	355·28	600·45
South Arcot	253·52	55·72	299·88	609·12
North Arcot	245·12	129·93	302·67	677·72
Salem	239·26	50·41	262·99	552·66
Dharmapuri	235·24	96·07	238·02	569·33
Coimbatore	190·09	50·98	260·79	501·86
Tiruchirapalli	205·54	67·93	219·72	493·19
Thanjavur	218·29	90·83	234·52	543·64
Madurai	236·99	104·99	416·46	758·44
Ramanathapuram ...	202·39	84·21	213·07	499·67
Tirunelveli	...	...	...	...
The Nilgiris	...	...	...	...
Kanyakumari	222·14	86·66	271·07	579·87
State Average	221·92	79·13	279·49	580·54

TABLE 1—(*contd.*)

COTTON (in Rupees)

Districts	Human labour	Bullock labour	Materials	Total cost
(1)	(2)	(3)	(4)	(5)
Chingleput	...	...	...	...
South Arcot	...	...	...	...
North Arcot	...	...	...	...
Salem	...	...	...	...
Dharmapuri	...	...	...	...
Coimbatore	245·12	60·37	164·62	470·11
Tiruchirapalli	...	...	...	...
Thanjavur	...	...	...	...
Madurai	333·58	59·53	178·65	571·76
Ramanathapuram ...	232·87	81·42	148·70	462·99
Tirunelveli	218·44	61·77	142·38	422·59
The Nilgiris	...	...	...	...
Kanyakumari	...	...	...	...
State Average	257·50	65·77	158·59	481·86

Source: "Cost of Cultivation Report" by the Directorate of Statistics, Tamil Nadu Government.

TABLE 2—COST OF CULTIVATION PER ACRE OF HIGH YIELDING VARIETIES OF FIVE DRY CROPS IN TAMIL NADU

(in Rupees)

Particulars of cost items	Cholam	Cumbu	Ragi	Groundnut	Cotton	
					K-7	MCU–6
Preparation	40·00	40·00	40·00	50·00	40·00	40·00
Manures and manuring	70·00	65·00	70·00	120·00	80·00	100·00
Seeds and sowing	20·00	15·00	20·00	25·00	10·00	10·00
After cultivation	20·00	15·00	20·00	30·00	25·00	25·00
Plant protection	30·00	25·00	25·00	40·00	80·00	80·00
Harvest	25·00	25·00	30·00	40·00	20·00	30·00
Total cost per acre	205·00	185·00	205·00	305·00	255·00	285·00
Total cost per hectare	505·00	460·00	505·00	755·00	630·00	705·00
Yield per acre (in kg.)	...	800	...	...	250	400
Yield per hectare	1500	2000	1500	950	600	1000
Receipts per acre	...	450	...	...	500	800
Receipts per hectare	1050	1100	975	1250	1200	2000
Net profit per acre	...	265	...	...	245	800
Net profit per hectare	545	640	470	495	570	1295

Source : Costs calculated on the basis of "Package of Practices" recommended by the Directorate of Agriculture.

TABLE 3—COST-RETURN ANALYSIS PER HECTARE OF FIVE DRY CROPS FOR TRADITIONAL AND HIGH YIELDING VARIETIES

	Cholam		Cumbu		Ragi		Groundnut		Cotton	
	Traditional	HYV	Traditional	HYV	Traditional	HYV	Traditional	HYV	Traditional	HYV
Cost per hectare.	304·15	505·00	237·52	460·00	420·30	505·00	580·54	755·00	481·86	705·00
HYV as % of total cost ...	100	166·1	100·00	193·3	100	120·2	100·00	130·2	100	146·3
Yield per hectare (in kg.) ...	550	1500	600	2000	800	1500	620	950	450	1000
HYV as % of total ...	100	272·7	100	333·3	100	187·5	100	156·4	100	222·2
Receipts per hectare ...	385	1050	395	1100	520·00	975·00	805·00	1250	765·00	2000
HYV as % of Total ...	100	272·8	100	278·5	100	187·5	100	155·3	100	261·4
Net return per hectare ...	80	545	157·48	640	100·00	470·00	225·00	495·00	285·00	1300
HYV net return as % of total ...	100	681·3	100	405·1	100·00	470	100	220	100	456·1

Source : Derived from the last two Tables 1 and 2, Appendix 1.

TABLE 3(a)—COST-RETURN ANALYSIS FOR DRY CROPS UNDER TRADITIONAL AND HIGH YIELDING VARIETIES

Particulars	Cholam	Cumbu	Ragi	Groundnut	Cotton
Cost of cultivation per kg. of produce					
Traditional	0·55	0·40	0·53	0·94	1·07
HYV	0·34	0·23	0·34	0·79	0·71
Return of profit per kg. of produce					
Traditional	0·15	0·25	0·12	0·36	0·73
HYV	0·36	0·42	0·29	0·51	1·09
Return per Rupee invested					
Traditional	0·26	0·66	0·24	0·39	0·59
HYV	1·08	1·40	0·93	0·66	1·84

CHAPTER III—APPENDIX 2

PACKAGE OF PRACTICES

The cultivation of high yielding varieties implies conscious adoption of the recommended practices and involves adherence to all the improved methods and practices in combination to achieve the best results. Thus the combination of practices to be followed are laid down right from the stage of preparatory cultivation up to the stage of harvesting. The omission in any particular operation at the appropriate stage is likely to affect the crop growth and ultimately the yields. The heavy cost incurred (which is given in Appendix 1) warn against the consequences of such omissions. The cost of production data for the five dry crops given in Appendix 1 are based on the following " package of practices ".

(1) Hybrid Sorghum—CSH. 3

Duration of Season : 110-120 days. Suited for the monsoon rainfed season. July-August—Other districts; Oct.-Nov. Southern districts.

Preparation of Land : (i) Plough well to obtain a good tilth. (ii) Incorporate 10 to 15 cart loads of cattle manure or compost per acre.

Seed Rate : (i) Adopt not more than 6 kg. per acre. (ii) Use only certified seed every season.

Seed Treatment : Treat the seeds with sulphur at the rate of 2 gm. per kg. of seed, if untreated at the supplying centre.

Sowing : (i) Sow the seeds in rows of 45 cm. (18 inches) apart. (ii) Thin out seedlings to a spacing of 15 cm. (6 inches) after 3 or 4 weeks.

Manuring : (i) Apply fertilizers at sowing time in furrows. (ii) Use 18 g. N, 9 kg. P and K as straight fertilizers as a basal dressing.

After cultivation : (i) Hoe and weed between 20th and 25th day.

(ii) Thin out seedlings to retain one plant at 15 cm. (6 inches) apart 3 weeks after sowing.

Plant Protection :

(*i*) *Shoot fly*, affects the very young seedlings even on the 7th day with appearance of first symptoms of dead hearts, spray 50% carbaryl at 15 gm. per 4·5 litres of water (200 litres spray fluid may be required per acre). This should be treated on the 14th day of sowing also. Spray a combination of 3 cc. Endrin and 2 cc. of metasystox in 4·5 litres of water.

(*ii*) *For stem-borer*, affecting from the 3rd week onwards, spray carbaryl (sevin) 50% at 15 grams per 4·5 litres of water mixed with sulphur (10 gm. on 21st day and 10 days later if necessary).

OR

Apply 2% Endrin granules in the whorls of plants on the 21st day and 30th day after sowing.

(*iii*) Dust with fine sulphur dust or spray wettable sulphur if *mites* appear.

(*iv*) For *midge fly*, spray carbaryl (sevin 50% w.p.) immediately at 1·5 gm. per 4·5 litres of water on panicles only.

OR

Dust a mixture of DDT 5% and BHC 10%, 5 kg. in each immediately on emergency of earheads.

(*v*) For earhead bug and earhead caterpillar DDT 5% + BHC 10% to be dusted 10 days after emergence and for a second time if necessary, 10 days later.

(*vi*) For stalk and root rot disease, soil drenching with 0·1 per cent solution of wet organo-mercurial like ceresan, i.e., 1 kil. in 1000 litres of water, will conrol the spread of the disease.

(*vii*) Scaring of birds from damaging grains has to be done to get the maximum returns.

(2) Hybrid Cumbu HB. 1—HB. 4.

Nursery : Prepare the seed bed area very well. An area of 4 cents will be required to raise seedlings for transplanting in an acre.

Apply well-rotten farmyard manure or compost at the rate of 10 tonnes per acre. The beds may be raised by 3″ to 4″ above ground level. Sow the seeds in lines 4′ apart in furrows made by a hand hoe. Lightly cover with soil, and let in water into the channels surrounding the beds and let the water seep through the bed. One kg. of seed will be sufficient for sowing in 4 cents. Before sowing treat the seeds with Agrosan or ceresan or any other organo-mercurials at 2 grams per kg. of seed if it has not already been treated.

Mainfield : Prepare the field (an area of one acre) well and form into beds of 9 feet wide and 20 feet long or of any suitable length depending on the slope of the land. A basal dressing of 10 tonnes of farmyard manure may be applied and worked into the soil before forming beds. Ammonium sulphate or urea to supply 18 kg. of N superphosphate to supply 14 kg. of P205 and muriate of potash to supply 9 kg. of K20 may be applied on beds and covered. Transplant the seedling when they are 18 to 20 days old. One month after transplanting apply the remaining 10 kg. N. The crop matures in 85 days and it may be harvested.

Plant Protection

Serial No.	Pest	Time of Application	Name of Chemical	Rate of Application
1	Shootfly ...	At the time of sowing in the furrow.	Phorate 10% granules or disulfoton(Disyston) 5% granules or solvirex 5%. granules.	1·5 gm./metre row 3 gm./metre row Do.
		First spray seventh day after sowing and second spray 15th day after sowing.	Metasystox	3 ml. of Endrin plus 2 ml. of methyl demeton (Metasystox) in 4·5 litres of water.
2	Stem borer ...	21 days after sowing and repeated at 15 days intervals till the time of flowering.	Endrin 2% granules in the whorls of leaves or carbaryl 50% W. P. plus wettable sulphur.	10 to 15 kg./ha. 2 gm. / litre, 1 gm./litre.

Serial No.	Pest	Time of Application	Name of Chemical	Rate of Application
3	Mite ...	As and when occurs.	Sulphur dust or sulphur W. P. (spray).	1 kg. in 500 litres of water.
4	Gallmidge ...	First round at the flowering stage and the second round at the milky stage.	*Carbaryl 10% dust or mixture of DDT 5% plus BHC. 10% in equal proportions.	25 kg./ha. 25 kg. of the mixture.

* The above treatment will control the earhead, caterpillars and bugs.

Sugary Disease : Spray Zineb or Wettable Sulphur 3 times (i.e.) first at flowering stage, Second spray 5 days after first spraying and third spray 5 days after second spray.

(3) Ragi

Ragi CO9 is an improved strain suitable for the entire State.

Season: Monsoon season (May-June); Summer season (December-January).

Duration : 100 to 105 days.

Nursery Area Required: 300 sq. m. for one hectare.

Seed Rate : 4 kg. of seed per hectare.

Manuring—Organic : 50 cart loads of farmyard manure per hectare to be applied as basal dressing.

Nursery Period : 22 days.

Main field—Preparatory Cultivation : 3 or 4 ploughings are given until good tilth is obtained. Beds are formed 3 m. × 3 m. (size of the bed depending on the sources of water).

Manuring—Basal Dressing : Apply 25 tonnes of farmyard manure or compost per hectare as basal dressing before the last ploughing and incorporate in the soil, 45 kg. N, 45 kg. P2O5 and 45 kg. K2O per hectare as basal.

Top Dressing : 45 kg. N per hectare to be applied as top dressing after the first hoeing and weeding (3 to 4 weeks after planting).

Spacing : 15 cm. × 15 cm. row to row, and plant to plant. Two seedlings per hole may be given as and when required.

Plant Protection—Pests

(1) *Root Aphids :* Drenching the soil with 0·1% BHC. 50% wettable powder may be done.

(2) *Stem-borer :* Spraying may be done with BHC. 50% at 0·5 kg. in 60 litres of water with concentration of 0·04% (200 ml. in 100 litres of water).

Disease-Blast : If the blast is noticed in the transplanted crop dusting with ceresan lime dust and spraying with 1% Bordeaux mixture or any other copper fungicide.

Harvest: The crop will be ready for harvest in 100 to 105 days.

(4) Cotton

Preparation of Land : As a rule, the land should be ploughed until a good tilth is obtained.

Improved Strains Recommended : Unirrigated American (winter-rainfed), Bharathi.

Unirrigated American desi (winter-rainfed), K-7

Seed Treatment: Treat the seeds with agrosan, ceresan or T.M. T.D. at 2 gram per kilogram of seed. As far as Desi cotton is concerned rub the seeds with a paste consisting of a mixture of cow-dung and red earth and dry in shade.

Seed Rate: Bharathi and K-7 20 kg. per hectare.

Method of Sowing: Under unirrigated or rainfed conditions sow in lines with help of gorru or country seed drill.

Spacing: For rainfed American and Desi cotton adopt a spacing of 45 cm. between rows and 15 cm. between plants and leave one plant per hill.

Time of sowing: Unirrigated American (winter-rainfed) Unirrigated Desi (winter-rainfed) } October

Manuring: For rainfed cotton, apply N 40 kg. per hectare and P205 20 kg. per hectare at the time of last ploughing.

After Cultivation: Weed depending on the soil moisture on the 20th day and again on the 40th day after sowing. After 40th day work dantulu harrow repeatedly to prevent cracking of soil and to conserve soil moisture.

Plant Protection: Dust a mixture of DDT 5% and BHC 10% (1:1) when the seedlings are 15 to 20 days old. Thereafter five rounds of dusting with sevin and sulphur (2:1) which are to be given at fortnightly intervals to control spotted boll worm and gram caterpillar.

Harvest: Pick kapas clean in the mornings. Dry the harvested kapas in the shade. Clean and grade the produce to get better price. Pull out the stalks promptly after the harvest is over so that there will not be any carryover of pests.

COTTON ZONES RECOMMENDED VARIETIES AND THEIR CHARACTERS

Name of Cotton Zones	Normal area in lakh/ha	Production of Lint in lakh bales (180 kg.)	District where grown	Season	Recommended strain	Duration in days	Kapas yield quintal per ha. (100 kg.)	Ginning %	Staple length (inch)	Spinning value H.S.C.
1. Unirrigated American (winter rainfed)	0·78	0·40	Ramanathapuram, Tirunelveli and Madurai	Oct. to June	Bharati (MCV 6)	180	3–5	36	32/32″	40 S
2. Unirrigated Desi (winter rainfed)	1·53	0·46	Coimbatore, Tiruchi, Ramanathapuram, Tirunelveli and Madurai	Oct. to June	K-7	195	2–3	36	31/32″	36 S

(5) Groundnut

Preparatory Cultivation: Plough 4-6 times with iron plough.

Manures and Manuring: Apply farmyard manure or compost 6 tons and 11 kg. N plus 22 kg. P205 plus 33 kg. K20 per hectare as basal dressing. After a fortnight apply 10 kg. borax and 200 kg. of gypsum per hectare as basal dressing.

Seeds and Sowing

Spacing: 6″ × 6″ for Bunch varieties and 9″ × 9″ for spreading varieties.

Seed Rate: 140-150 kg. per hectare for bunch variety and 100-110 kg. for spreading variety.

Seed Dressing: Dress the seed kernels before sowing with T.M.T.D. or 'Captan' 2·5 gm. per kg. of kernel.

Inoculation: Broadcast bacterial culture mixed with sand 7 bottles per hectare before or after sowing.

After Cultivation Practices: First hoeing and weeding between the 20th and 25th day after sowing. Second hoeing and weeding from the 35th to 45th day after sowing, removing subsequently prominent weeds from 70th to 90th day.

Plant Protection

(1) *Red hairy caterpillar* (Amsaeta Spp): The caterpillars defoliate the plants. It is one of the worst pests in South India.

Control Measures: (a) Application of D.D.V.P. (Nuvan) 100 at 0·1% strength (100 ml. in 100 litres of water) and heliotox E.C. at the rate of 750-1000 ml. per acre. (b) Endosulfon (Thiodan) 35% E.C. at 0·1% concentration has also given excellent control of the red hairy caterpillar.

(2) *Surul Poochi:* The caterpillars mine the leaves and also bind together adjacent leaves and feed on the leaf tissue.

Control: Spraying Velexon 0·05% or texaphene + DDT + Dimethoate (750-1000 ml./acre) parathion 0·05% or chlorfenvinphos (Birlane) 0·1% or Fenitrothion 0·05% or Fenitrothion 2% dust or lindane 0·02% or Endrin 0·02% thrice at intervals of 21 days from the 4th week stage of the crop.

(3) *The Plant Lice* (Aphid): The nymphs and adults suck the plant sap from the tender portions of the plants.

Control: Application of carbophenothion (Trithion) 0·06% (20% E.C. 300 ml. in 100 litres of water) Methyl Demeton (Metasystox) 0·02% (100 ml. in 100 litres of water) or Dimethoate (Eketion).

Disease—Tikka leaf spot:

Remedial Measures: Spraying with 4-4-50 Bordeaux mixture or other copper fungicides 2 times or dusting sulphur twice at 10 kg. per acre.

Root Rot: Seed treatment with organo-mercurials at 2½ gm. per kg. or captan. Drenching the soil with 0·1% wet ceresan.

Wilt: Soil drenching with 0·1% wet ceresan twice, one before peg formation and another after peg formation.

Source: Agricultural Compendium Tamil Nadu 1971-72, Directorate of of Agriculture, Tamil Nadu.

CHAPTER IV

PROBLEMS, POLICIES AND RECOMMENDATIONS

THE analysis in Chapter III suggests that the introduction of HYV's in Tamil Nadu dry areas will have two favourable effects.

(i) It will increase significantly the productivity and output of dry crops.

(ii) It will increase the income of the dry farmer and make a dent in their poverty stricken levels of living.

It was noted earlier that more than 50 per cent of cultivators in the State are dry farmers. They are poor and cannot finance the new inputs and techniques of cultivation. There is little scope for bringing dry lands under cultivation of HYV, unless the resource position of the dry farmer is significantly improved. The present chapter is, therefore, concerned in relation to Tamil Nadu, with

(i) a review of the credit problems faced by the dry farmers ;

(ii) the policy of the Government and financial agencies with regard to credit supply to the dry farmer ; and

(iii) recommendations and proposals.

Credit Problems of the Dry Farmer

One of the acute problems faced by the dry farmer is credit, both in regard to the amount and its access. Unless adequate credit is available at the appropriate time, no programme of improved dry farming is possible. The access to credit of the dry farmer for purchasing the necessary inputs is limited, since he is unable to offer the necessary security.

Both in regard to amount and access, the credit situation for the farmer before the fifties was grim. According to the Rural Credit Survey Report of 1951-52, the average borrowing per cultivating family in Tamil Nadu was Rs. 398·90. Out of this, Rs. 202·40 was provided by agricultural money-lenders. This was 50·7 per cent of the total credit obtained by the farmer. Professional money-lenders provided Rs. 89·9, that is, 22·5 per cent of the total credit. Thus money-lenders alone contributed 73·2 per cent of the total credit. The Government

TABLE 1—AVERAGE BORROWING PER CULTIVATING FAMILY CLASSIFIED ACCORDING TO CREDIT AGENCY, 1951-52

(in Rupees)

Particulars	Government	Co-operatives	Relatives	Landlords	Agricultural money-lenders	Professional money-lenders	Traders and Commission Agents	Commercial Banks	Others	Total
Amount of borrowing	9·10	8·90	9·60	1·40	202·40	89·90	61·80	10·00	5·80	398·90
As percentage of total borrowing....	2·3	2·2	2·4	0·4	50·7	22·5	15·5	2·5	1·5	100·00

Source: All-India Rural Credit Survey Report, 1951-52.

provided Rs. 9·10, that is, 2·3 per cent of the total credit. Co-operatives provided Rs. 8·90, that is, 2·2 per cent of the total credit and commercial banks provided Rs. 10, that is, 2·5 per cent of the total. Thus organised financial institutions provided only 7 per cent of the total credit flow to the farmers. Due to the inadequate supply of credit from these institutions, farmers depended heavily on the money-lenders who charged usurious rates. The status of credit supply to the farmers is set forth in Table 1.

According to the All-India Rural Debt and Investment Survey 1961-62, the situation, both with regard to All-India and Tamil Nadu, has not noticeably changed after a decade. During this period, a total of Rs. 855·20 per cultivating family per annum was made available as credit. Of this, Rs. 333·10 was for capital expenditure in farm business and Rs. 88·20 was for current expenditure in farm business. Thus altogether Rs. 421·30 was spent on farms, constituting 50 per cent of the total borrowing. An equal amount was borrowed by the farmers for consumption purposes. It is evident from Table 2 below that the lower the value of assets owned by the farmer, the larger was the percentage of the borrowing for purposes other than the business of farming. In the lowest asset group, (less than Rs. 500), out of a total borrowing of Rs. 214·50 only Rs. 66 was expended for capital and current expenditure on farm business. This constitutes 32·5 per cent of the total borrowing of that group.

TABLE 2—ALL-INDIA RURAL DEBT AND INVESTMENT SURVEY: 1961-62

Average debt outstanding per cultivating family* on cash loans as on 30th June 1962.

(in Rupees)

Asset group	Purpose		Other expenditures	Total
	Capital expenditure in farm business	Current expenditure in farm business		
Less than 500 ...	26·80	39·20	149·50	214·50
500—1,000 ...	51·60	22·20	163·10	236·90
1,000—2,000 ...	85·30	35·10	207·10	327·50
2,500—5,000 ...	181·80	78·30	325·10	585·20
5,000—10,000 ...	299·00	76·70	521·90	897·60
10,000—20,000 ...	611·60	147·40	716·00	1,475·00
20,000 and above ...	1,912·00	362·30	1,505·20	3,779·50
All asset groups ...	333·10	88·20	433·90	855·20

Source: Organisational Frame Work for the Implementation of Social Objectives. Report of a study group of the National Credit Council—A. 376.

Further it can be seen from Table 3 that of the total credit of Rs. 855·20 per cultivating family as much as Rs. 566·20 was provided by agricultural money-lenders and Rs. 57·70 was provided by professional money-lenders. Thus money-lenders provided Rs. 623·90 per cultivating family, which constitutes 73 per cent of the total credit. This is only 0·2 per cent lower than the 1951-52 level. Over ten years almost no change seems to have occurred in the structure of agricultural credit. Institutional agencies like commercial banks, co-operatives and Government have provided Rs. 9·50, Rs. 84·50, and Rs. 26·20 respectively per cultivating family in Tamil Nadu. Their share of the credit supplied is only Rs. 120·20, which constitutes 14 per cent of the total supply to the farmer. Though small in volume, this institutional credit source has doubled compared to the 1951-52 level. A notable advance is with regard to co-operatives which increased credit supply from 2·2 per cent of the total, per cultivating family in 1951-52 to nearly 10 per cent in 1961-62. The progress with regard to commercial banks as a source of credit supply to farmers during 1951-61, is disappointingly low, standing at 1 per cent in 1961.

Table 3 also shows that the overall summary figures of credit availabilities that were referred to earlier are misleading because the amount of credit made available by institutions to small farmers is alarmingly low. Out of Rs. 214·50 borrowed per cultivating family in the asset group less than Rs. 500, the Government supply was Rs. 1·30, commercial banks Rs. 0·70 and co-operatives Rs. 7·40. Altogether they provided Rs. 9·40 which constitutes 4·4 per cent of the total credit borrowed by the small farmers. The high rate of concentration of institutional credit in the hands of the big farmers is evidenced in their share of Rs. 628·70. This constitutes 17 per cent of the total borrowing of the above Rs. 20,000 asset group. A further Rs. 288 was borrowed by Rs. 10,000—20,000 asset group from these institutions which constituted as much as 19·5 per cent of their borrowing. The big farmers were the major beneficiaries of institutional credit.

It is evident from Table 4 that in the case of small farmers (less than Rs. 500 asset holders), out of the total borrowing of Rs. 63·50 per cultivating family, only Rs. 22·30 was spent on farm business which constituted 30 per cent of the borrowing. Unlike in the case of big farmers, whose credit was primarily for farm business more than 50 per cent, there was a higher rate of borrowing by small farmers for consumption purposes.

TABLE 3—CREDIT AGENCY

(in Rupees)

Asset Group	Government	Co-operatives	Commercial Banks	Landlords	Agricultural money-lenders	Professional money-lenders	Traders and commission agents	Relatives	Others	Total Debt
Less than 500 ...	1·30	7·40	0·70	3·20	152·60	6·80	1·30	37·50	3·70	214·50
500—1,000 ...	2·00	7·20	...	1·00	198·20	3·70	1·70	10·30	12·90	236·90
1,000—2,500 ...	5·20	25·40	0·30	0·70	254·80	18·60	8·20	5·10	9·20	327·50
2,500—5,000 ...	14·90	45·20	2·80	2·00	422·50	33·50	22·50	15·00	26·90	585·20
5,000—10,000 ...	24·00	65·20	12·00	0·50	650·70	46·00	15·20	28·80	55·10	897·60
10,000—20,000 ...	71·30	175·40	41·30	0·90	946·20	80·60	61·80	38·50	58·90	1,475·00
Above 20,000 ...	122·90	480·10	25·70	13·50	2,177·40	370·20	369·60	11·60	238·50	3,779·50
All Asset Groups ...	26·20	84·50	9·50	2·20	566·20	57·70	44·80	19·90	44·20	855·20

Source : Organisational Framework for the Implementation of Social Objectives—Report of a study group of the National Credit Council—A. 376.

TABLE 4—ALL-INDIA RURAL DEBT AND INVESTMENT SURVEY: 1961-62

Average amount borrowed per cultivating family classified according to purpose (cultivators).

(in Rupees)

Asset Group	Capital expenditure in farm business	Current expenditure in farm business	Others	Total
Less than 500	12·90	9·40	41·20	63·50
500—1,000	24·80	14·90	66·10	105·80
1,000—2,500	26·20	18·20	72·50	116·90
2,500—5,000	56·50	33·40	130·90	220·40
5,000—10,000	101·70	52·30	158·50	312·50
10,000—20,000 ...	193·10	75·10	309·70	577·90
Above 20,000	407·80	183·90	557·70	1159·40
All Asset Groups ...	92·40	45·30	160·10	297·80

Source: ibid, A. 397.

Table 5 shows that of the total borrowing of Rs. 297·80 per cultivating family during 1961-62 only Rs. 8·10, Rs. 49·10, and Rs. 3·60 were supplied by Government, Co-operatives and Commercial Banks respectively. Thus they together supplied Rs. 60·80 per cultivating family which constituted 20·4 per cent of the borrowing per family during 1961-62. There is, however, a variation in this distribution of credit sources as between different groups. The smallest asset group (less than Rs. 500) did not benefit from Government finance. Co-operatives provided Rs. 3·30 and Commercial Banks Rs. 0·40, out of the total borrowing of Rs. 63·50 during 1961-62. For the small farmer institutional finance or credit constituted only Rs. 3·70 that is 5·8 per cent of the total borrowing during 1961-62, whereas in the case of the big farmer it provided Rs. 275·20 which constituted about 24 per cent of his borrowing. In the main, the big farmer benefited from institutional agency credit, partly because the small farmers could not provide the necessary security required by the agencies.

TABLE 5—CREDIT AGENCY

(In Rupees)

Asset Group	Government	Co-operatives	Commercial Banks	Landlords	Agricultural money-lenders	Professional money-lenders	Traders and commission agents	Relatives	Others	Total borrowings
Less than 500 ...	...	3·36	0·40	1·20	49·30	1·70	1·00	3·30	3·40	63·50
500—1,000 ...	0·20	6·10	0·10	0·20	78·50	2·20	1·10	7·60	9·80	105·80
1,000—2,500 ...	1·90	16·40	0·20	0·10	79·80	5·00	4·00	4·00	5·40	116·90
2,500—5,000 ...	1·80	33·30	0·90	0·20	150·80	14·20	2·60	5·40	11·00	220·40
5,000—10,000 ...	6·80	45·00	2·80	0·50	183·40	19·40	2·70	17·80	34·10	312·50
10,000—20,000 ...	33·00	103·80	19·90	0·80	312·10	33·80	14·80	26·80	32·80	577·90
Above 20,000 ...	31·40	236·00	7·80	2·00	636·80	110·60	41·40	16·90	76·60	1159·40
All Asset Groups ...	8·10	49·10	3·60	0·60	178·10	20·20	7·00	10·60	20·60	297·80

TABLE 6—TOTAL DEMAND AND SUPPLY OF CREDIT

Groupwise Size	Number	Net area cultivated (acres)	Demand for credit Rs.	Supply of credit Rs.	Credit gap Rs.	Percentage of gap to demand
Less than 2·5 acres	100	151·47	168,415	63,205	105,210	62·77
2·5—7·5 acres	115	539·89	428,338	167,580	260,758	60·88
7·5—15·00 acres	34	358·71	266,170	120,490	145,680	54·73
More than 15·00 acres	9	201·47	137,250	60,300	76,950	56·07
Total ...	258	1251·54	1,000,173	411,575	588,598	58·15

Source : Impact of Institutional Finance for Agricultural Development in Tamil Nadu, by the Directorate of Agriculture, Tamil Nadu, page 30.

It may, therefore, be concluded that the credit supply to the small farmer has not in effect improved in 1961 compared to 1951-52. What has happened since then ? With a view to identifying the part played by different agencies in the provision of agricultural credit in Tamil Nadu, the Directorate of Agriculture conducted a survey in January 1970, the findings of which are enlightening and are set forth in Table 6.

From Table 6 above it can be seen that there exists a credit gap of 58·15 per cent of the total credit requirements of the farmer. Only 41·85 per cent of his requirements is met. But even this availability varies from farmer to farmer according to his economic status. The credit gap is as high as 62·47 per cent in the case of farmers who have less than 2·5 acres and 54·73 per cent in the case of farmers who have 7·5 acres to 15 acres.

TABLE 7—STATEMENT SHOWING SIZE—GROUPWISE AND SOURCE-WISE SUPPLY OF CREDIT AND PERCENTAGE IN THE SAMPLE FARMS

(In Rupees)

Group Size	Amount of credit supplied by				
	Government	Commercial Banks	Co-operatives	Private sources	Total
Less than 2·5 acres ...	8250 (13·05)	7500 (11·87)	6720 (10·63)	40735 (64·45)	63205 (100·00)
2·5 to 7·5 acres ...	28570 (17·05)	17400 (10·38)	66610 (39·75)	55000 (32·82)	167580 (100·00)
7·5 to 15·00 acres ...	29140 (24·18)	6000 (4·98)	39450 (32·75)	45900 (38·09)	120490 (100·00)
More than 15·00 acres.	3750 (6·22)	10000 (16·58)	46550 (77·20)	...	60300 (100·00)
Total ...	69710 (16·94)	40900 (9·94)	159330 (38·71)	141635 (34·41)	411575 (100·00)

Source : Impact of Institutional Finance for Agricultural Development in Tamil Nadu, by the Directorate of Agriculture, Tamil Nadu, page 9.

Table 7 indicates that private agencies play a more significant part in the case of small farmers than in the case of big farmers. They provide as much as 64·45 per cent of the credit requirements of the small farmer, whereas for farmers in the group 2·5—7·5 acres they provide only for 32·82 per cent of their requirements. In the case of those who have more than 15 acres, they play no part.

The institutional agencies which have so far played only a minor role in the supply of credit, have increased their share from 14 per cent to 65·59 per cent of the total credit supplied.

At this stage two conclusions suggest themselves : (i) the available supply of credit falls short of the farmers' requirements and (ii) the contribution made by institutional agencies like the Government, Co-operatives and Commercial Banks is relatively small.

Against this background, a review of the institutional agencies and their problems is attempted.

Co-operative Societies: The pattern of organisation of co-operative societies and the present level of local leadership often dominated by vested interest do not seem to be conducive to the participation of small farmers and their availing themselves of credit facilities. Dry farmers are mostly small farmers. The small farmers do not benefit in an important manner from the co-operatives, as is evident from Table 8. In 1966-67, the number and the amount of co-operative credit extended upto Rs. 500 constitutes Rs. 1,479 lakhs out of a total of Rs. 3,140 lakhs. About Rs. 1,124 lakhs were given in the form of loans ranging from Rs. 500 to Rs. 1,000, Rs. 516 lakhs in the form of loans Rs. 1,000 to 5,000 and Rs. 21 lakhs in the form of loans above Rs. 5,000. The smallest loans (i.e., upto Rs. 100) constitute 3 per cent of the total loans and loans below Rs. 300 constitute 18 per cent of the total. (Refer Table 8.)

Table 9 shows the distribution of credit facilities provided by primary agricultural societies in 1966-67.

From Table 9 it is evident that there were only 7,420 active societies for 14,124 villages, of which 7,738 villages are covered by these societies in Tamil Nadu, that is, 55 per cent of total villages. This provides a coverage of 48 per cent of the rural population. Though the total membership of these societies is 32 lakhs, only 23 per cent of the members benefit from these co-operative societies. The average

TABLE 8—SIZE WISE CLASSIFICATION OF LOANS ISSUED BY

	Upto 100	101-300	301-500
	(1)	(2)	(3)
Tamil Nadu ...	104	474	901

Source : Organisational Framework for the Implementation of Social

TABLE 9—DISTRIBUTIONS OF CREDIT FACILITIES PROVIDED BY

Total number of Societies	Number of active societies	Number of villages		% of villages covered	Population in villages (000's)	% of Population covered by active societies
		In the State	Covered by active societies			
(1)	(2)	(3)	(4)	(5)	(6)	(7)
10618	7420	14124	7738	55	26447	48

Source : Organisational Framework for the Implementation of Social

PRIMARY AGRICULTURAL CREDIT SOCIETIES DURING 1966-67

(Rupees in lakhs)

501-1,000	1,001-5,000	Above 5,000	Total	Percentage of Col. 1 to Col. 7	Percentage of Col. 1+2 to Col. 7
(4)	(5)	(6)	(7)	(8)	(9)
1,124	516	21	3,140	3	18

Objectives, S. 21 and S. 22.

PRIMARY AGRICULTURAL CREDIT SOCIETIES IN 1966-67

No. of membership of all Societies (in lakhs)	% of borrowing members to total membership	Deposit (Rs. in lakhs)	Loans issued by societies during 1966-67		Average loan issued per	
			Amount (Rs. in lakhs)	% to total	Member Rs.	Borrowing member Rs.
(8)	(9)	(10)	(11)	(12)	(13)	(14)
32	23	289	3,140	8·6	97	427

Objectives, S. 21 and S. 22.

loan issued per member is as low as Rs. 97 and per borrowing member is Rs. 427. The total membership, the loan facilities and the number of societies are inadequate in relation to the requirements of State agriculture.

There is also the recurrent problem of considerable delays in getting loans sanctioned and in the timely provision of the supplies in kind part of the loan. The purpose of loan not being realised, there are consequent serious problems of repayment.

The co-operative credit structure in Tamil Nadu comprises of the Madras State Co-operative Bank, 16 Central Co-operative Banks and 8,875 Agricultural Credit Societies. All the Central Banks, excepting that of Pudukottai, are viable institutions according to accepted credit norms. Operationally, however, the working of some of them has deteriorated in recent years. In part, this set-back has resulted from the fact that the managerial personnel of some of the Central Banks are not persons with the requisite expertise.

At the primary level in Tamil Nadu the position in 1961-62 according to the All-India Rural Debt and Investment Survey was that 12·2 per cent of the cultivator households had borrowed from the co-operatives and that such borrowings formed 16·5 per cent of the borrowing of all the cultivator households. The subsequent years saw an increase in the advance of agricultural credit societies which reached Rs. 41·22 crores in 1963-64. It came down to Rs. 31·40 crores in 1966-67 and rose to Rs. 37 crores in 1967-68. But the number of those who borrowed from co-operatives went down from 48 per cent of the total members in 1960-61 to 23 per cent in 1966-67. This decline may be traced to the larger earlier increase in membership. As a result, the average of loans and share capital per member were generally lower in Tamil Nadu than those for all-India. The primary credit structure is in considerable need of reorganisation as less than 15 per cent of the Societies were found to be viable at the end of November 1966 according to a survey conducted for the purpose of identifying viable societies in the State.

The quantum of loans advanced to a member is related to the value of property owned by him. The principles of disbursement of loans in kind, seasonality in lending and recovery, and linking of credit with marketing are not as yet introduced in most of the areas. Further, although short-term loans are given against sureties instead of mort-

gages, the emphasis continues to be on assets and not on productive activity. Efforts to bring all sections of cultivators into the co-operative fold are not as yet adequately effective.

Further there is disparity in the scales of finance for owner-cultivators and tenant-cultivators and the loan ceiling in respect of tenants is often low, generally ranging from Rs. 500 to Rs. 1,000. Besides some of the banks, notably in Kanyakumari, Vellore and Coimbatore insist that the sureties for their loans to tenants should be the land owners. Overdues have been steeply increasing since 1964-65 and as on 30th June, 1968 accounted for 11 per cent of the outstanding loans at the central level and over 28 per cent at the primary level.

Resource mobilisation by the apex and central co-operative banks in the State has generally fallen short of the requirements and the level of their operation. The growth of deposits in these banks especially from the public and institutions other than co-operatives has been slow, apparently for lack of initiative and drive on the part of their key personnel and the non-official leadership. On the other hand, Tamil Nadu is one of the States in which long-term credit has made appreciable progress, the only problem being the considerable delay which occurs in the sanction of loans.

Table 10 given below pictures the progress of Co-operative Credit in the State.

TABLE 10—PROGRESS OF CO-OPERATIVE CREDIT IN TAMIL NADU

	1956-57	1960-61	1966-67
Agricultural Credit Societies—			
No. of Societies	8096	10690	10618
No. of villages covered	N. A.	14124	14124
Membership ('000)	879	2038	3225
% of memberships to Rural household (estimated)	N. A.	37·9	52·3
% of borrowing members to total memberships	...	47·9	22·8
Owned funds (Rs. in lakhs) ...	303	642	1368
Deposits (Rs. in lakhs)	50	109	289

TABLE 10—(*contd.*)

	1956-57	1960-61	1966-67
Loans Issued—			
Short-term (Rs. in lakhs) ...	...	1899	2904
Medium-term (Rs. in lakhs) ...	...	537	236
Total (Rs. in lakhs)	722	2436	3140
Loans outstanding (Rs. in lakhs) ...	894	2532	3807
% of overdues to outstanding loans.	13·0	12·1	35·4
Loans advanced per borrowing member (Rs. in lakhs)	...	249	427
Central Co-operative Banks—			
Number	14	15	16
No. of offices	20	22	104
Owned funds (Rs. in lakhs) ...	192	517	1437
Deposits (Rs. in lakhs)	497	1012	2060
Loans outstanding (Rs. in lakhs) ...	1102	3054	4403
% of overdues to outstanding loans.	2·3	1·0	15·9
State Co-operative Bank—			
Owned funds (Rs. in lakhs) ...	74	267	500
Deposits (Rs. in lakhs)	410	609	990
Borrowings from RBI (Rs. in lakhs)	382	1604	1179
Loans outstanding (Rs. in lakhs) ...	731	2219	2471
% of overdues to outstanding loans.	0·2	0·1	2·9
Central Land Development Bank—			
No. of branches	...	...	1
No. of primary and land development banks	72	94	105
Debentures Issued (Rs. in lakhs) ...	50	50	325
Loans Issued (Rs. in lakhs) ...	71	198	443
Loans outstanding (Rs. in lakhs) ...	405	679	2077
% of overdues to demand... ...	...	...	...

Source : Report of the All-India Rural Credit Review Committee, page 288.

Government Sources: The government sources consist primarily of the panchayat union councils, and to some extent the revenue and other departmental agencies such as special development offices of the Agricultural Department. Short-term loans for crop production and medium-term Taccavi loans for development purposes are provided by the government. The volume and eligibility of credit are based on the solvency of the client.

Taccavi loans issued during the period 1958-59 to 1965-66 is given below in Table 11.

TABLE 11

(Rs. in lakhs)

	1958-59	1959-60	1960-61	1964-65	1965-66
Tamil Nadu...	355·68	380·38	486·62	475·78	624·31

Source: Report of the All-India Rural Credit Review Committee, page 379.

The above table shows that government financing of agricultural operations has been increasing until the middle of the last decade.

One of the serious drawbacks of Taccavi loans relates to the small size of the loans. A sample of 372 Taccavi loans in Tamil Nadu during the years 1963-64 to 1965-66 showed that 43 per cent of the total number of loans were between Rs. 501 and Rs. 1,000, 26 per cent were between Rs. 1,001 and Rs. 2,000 and 22 per cent between Rs. 2,001 and Rs. 2,500. Loans exceeding Rs. 5,000 formed only 6 per cent of the total number.*

The hierarchical arrangement in regard to the authority for sanctioning different amounts for the same purpose is one of the important reasons for the small size of Taccavi loans. For instance, for financing the purchase of an oil engine or an electric motor, the Block Development Officer can sanction a loan upto Rs. 3,000 while the Collector must decide on loans upto Rs. 7,000. Further, in view of their small size, Taccavi loans are often found to be inadequate for the purpose for which they are given.

* Report of the All-India Rural Credit Review Committee, page 381

Lack of decentralisation and the lengthy, often unnecessary, procedural formalities which are required to be complied with, result in unconscionable delays in getting Taccavi loans.

The beneficiaries have remarked that the real cost of Government credit is high in view of the fact that they have to spend considerable time and money by way of incidental expenses in fulfilling the formalities required.

The lack of effective supervision over the utilisation of the loans is another of their well-known weaknesses. And also the timing and method of recovery of Taccavi dues are not entirely satisfactory.

Commercial Banks: The commercial banks provide mostly medium term loans on collateral security and hypothecation of machinery. Sometimes for some banks, the Government gives a purchase-guarantee. The commercial banks have been encouraged by the Government to issue short-term loans for crop production under special schemes of development of individual crops such as groundnut.

The banks are extremely chary of making loans in the absence of statutory provision for direct recovery, as in the case of Government and Co-operative loans. They are inclined to avoid the risks involved and consequently the small farmers have not been beneficiaries of bank credit. Again in the case of bank loans, the time schedule for repayment is not drawn with reference to harvesting and marketing periods.

A Policy Frame: Against this background of inadequate and halting credit supply, the introduction of HYV's in dry areas on a large scale, will call for large-scale and rapid changes in the volume and methods of functioning of these credit agencies. It is necessary at this stage to delineate an overall policy frame for the development of dry farming in the State. Such a policy must take into account the constraints and imperatives faced by the State and the Country in regard to a viable dry farming economy.

Though the importance of dry farming has long been recognised, the first three Plans made no special programme provision for its development. In the Fourth Plan its importance was recognised and the Central Government* allocated a token sum of Rs. 20 crores

* Fourth Plan 1969-74, page 154.

for application of packages of technology to dry farming. The State Government, due to financial constraints has not been able to introduce a large and specific programme of its own to promote dry farming.* It is proposed that in future Plans—both Central and State—dry farming be accorded adequate priority.

Within such a policy and taking into account the time, resources, and administrative constraints, it is proposed that, under a fifteen-year perspective plan, all the 37,95,000 hectares of dry land in Tamil Nadu should be brought under the HYV programme. Within such a perspective plan, concrete programmes in the Fifth Plan, both at the Central and State levels, should be planned in order to speed the introduction of HYV's in dry areas of the three most needy districts—Ramanathapuram with 4,03,000 hectares of dry lands, Dharmapuri with 3,85,000 hectares and Tirunelveli with 3,84,000 hectares. Such a Fifth Plan programme covering 11,72,000 hectares of dry farms in the three districts of Ramanathapuram, Dharmapuri and Tirunelveli will call for a plan provision of Rs. 23·4 crores as credit to the farmer plus Rs. 10 crores for the infra-structure and establishment costs of effective administration of such a programme. This total of Rs. 33·4 crores is computed as follows :

(*a*) The analysis in Chapter III shows that the average additional credit need per hectare of HYV dry farming is Rs. 200.

(*b*) The infra-structure and establishment is derived from the cost accounting described in Appendix I to this Chapter.

This total financial provision of Rs. 33·4 crores in the Fifth Plan should be shared between the Central source of financing which could be Rs. 23·4 crores and an allocation of Rs. 10 crores from the State's resources. The State provision can be met from the receipts from the long awaited agricultural income-tax directed to the rapidly growing surplus incomes being generated in the wet IADP areas. It is against this proposed dry farming programme for the Fifth Plan, that some recommendations are made with regard to institutional financing in Tamil Nadu.

Recommendations

Institutional credit has gained in some ways in introducing competition in the rural capital market and in constraining the

* A detailed account of the centrally sponsored programme in Tamil Nadu is given in Appendix 1 to this Chapter.

usurious practices of private money-lenders. There is still a long way to go in providing the small farmers and tenants with the finance they need for the new technology. Given the magnitude of credit and endemic organisational problems, the credit institutions have a significant role to play in the rural capital market by effective co-ordination of their various competing functions.

Co-operatives: The functioning of strong and viable units at the primary level is an urgent need as much for the sound borrowing and health of the entire co-operative credit structure, as for the successful implementation of agricultural programmes. It is important to complete within the next two years of the Fourth Plan the present programmes of co-operative reorganisation so that only viable or potentially viable primary agricultural societies remain in existence at the end of 1973-74.

The area of operation of Societies should not be so large that the cultivator finds it inconvenient to obtain the service required from the Society. Each society should be expected not only to provide larger credit and distribution facilities but also to mobilise deposits and diversify services.

The Central Co-operative Banks may open, where necessary, special lines of credit to agricultural credit societies for financing the distribution of fertilizers and other agricultural requisites. The share capital of the village society should be specially strengthened to the extent necessary for providing the base for such borrowing.

Lending Policies and Procedures: A crop loan system should be introduced widely throughout Tamil Nadu in dry areas. It is important that large cultivators should be required to plough back more of their own resources for financing production and development. The loan procedure should be so designed that the borrower gets the loan at the time when he needs it and with the least possible difficulty. Decentralisation of the authority of the Central Bank to sanction loans is also suggested.

Small Farmers' Development Agency: As far as procedures are concerned the proportion of the norms of outlay for different crops which is provided by way of co-operative credit should be higher for small cultivators than for large cultivators and the rates of interest on relatively large loans might be higher than those on smaller loans,

The large cultivators should be called upon to contribute a relatively large proportion of their borrowings from the society towards its share capital. Greater facility in this regard, such as payment in instalments should be extended to the small farmers.

Role of Commercial Banks, Government and Agricultural Credit Corporations : As the amount of credit needed for the implementation of the programme of introducing HYV's in dry areas on a large scale will be very high, these institutions (Commercial banks, Government, Land Development Banks, etc.) must increase their contribution to agricultural credit in all possible ways by augmenting their resources and allocating a larger percentage of their resources for dry areas. A target would be for these institutions to provide together about half the credit needs for HYV in dry areas which have been computed at Rs. 200 per acre. The procedure of the commercial banks lending will need to be modified to shift the credit criterion from the collateral of the dry farmer which he does not in any case have to the viability of the project. The differential rates as they apply to lending to the dry farmer must be based on the size of the farm, as the criterion. The facilities offered by the Agricultural Refinance Corporation and its decision to support dry farming must be more fully utilised. Even in the very modest 7 per cent sponsored by banks of the annual total of Rs. 300 crores of agricultural credit from the Agricultural Refinance Corporation, Tamil Nadu lags far behind. In this regard State legislation is required for the banks in Tamil Nadu to expand their credit to the small dry farmer. The amendments to State legislation must correct existing provisions under which the cultivators have no rights of alienation, the share croppers have no recorded rights and there is lack in general principles regarding priority of loans. Tamil Nadu must adopt the model bill suggested by the Reserve Bank of India as one means of removing the current legislative restrictions and promoting a free flow of credit to the dry farmer.

Tamil Nadu Dry Farming Authority : To plan, promote and execute the programme of renovated dry farming proposed in this study, including the important marketing programmes analysed in the next chapter, it is proposed that a statutory Body, 'The Tamil Nadu Dry Farming Authority' be established by the Government and legislature. The functions of the Authority will be :

(1) to plan moblisation and use of resources for dry farming renovation and development;

(2) to use all existing bodies and establish new agencies necessary to implement the dry farming plan and hold such agencies responsible and accountable to the Authority ;

(3) to organise the supply of investible funds for dry farming and arrange for the collection of loans ;

(4) to assume overall responsibility for acquisition, provision and distribution of needed agricultural inputs for dry farmers ;

(5) to arrange for and assemble, disperse and dispose the farm output in an orderly and economical manner ;

(6) to plan for deposit mobilisation and diversified investment in mixed farming ;

(7) to record tenancy rights, share cropping arrangements and arrange for distribution and consolidation of dry land ownership ; and

(8) to organise, intensify and promote Dry Farming Research in the Tamil Nadu Agricultural University and through the Tamil Nadu Agricultural Research Council, setting up an appropriate machinery for this purpose.

The Authority might begin its co-ordinating, promotional and directive activities in the three dry districts proposed for the Fifth Plan—Ramanathapuram, Dharmapuri and Tirunelveli and extend its activities to other districts in the two subsequent Plan periods.

The HYV dry farming programme proposed in this study faces two major pre-requisites. The first is the credit supply dealt with in this Chapter and the second is the marketing of the increased crop production that the dry farming break-through will involve. Credit coverage as referred to repeatedly in this Chapter also includes marketing. It is to some review of the marketing problems and perspectives for dry farm products that the next chapter is devoted.

CHAPTER IV—APPENDIX 1

INTEGRATED DRY LAND AGRICULTURAL DEVELOPMENT PROJECT

(1) Agriculture in the major part of Kovilpatti Taluk, which lies in a typical blacksoil tract in the State, depends mainly on rainfall and dry farming is extensively practised with intensive care. The typical black soil of this region is clayey in character and is texturally classified as heavy clay. It stands on a heavy Kanker bed and its depth varies from 5 to 7 feet. The top soil is black in colour while the sub-soil is generally grayish or light brownish. The clay and silt components account for about 70 per cent. These soils have high water holding capacity but this good character is off-set by their high hygroscopic co-efficient. Because of the high volume of expansion, penetration of water to lower levels is impeded. Water remains in the pore space more firmly held by colloidal clay and is thus lost easily by evaporation. Greater volume of expansion is followed by greater contraction on loss of soil moisture producing cracks and a hard and cloddy surface. The pH is generally normal though a number of areas show a tendency towards alkalinity. Available nitrogen is found to range from very low to low, the majority being very low. The top soil contains less than 0·1 per cent of soluble salts and the percentage of nitrogen in this layer varies from 0·03 to 0·05 which is very low. While the total phosphoric fraction is very low, the available fraction of this acid is fairly high. The soil is also rich in potash and is high in cation exchange capacity.

(2) The tract receives an annual rainfall of 765 mm. in 69 rainy days. More than half of this rainfall, i.e., about 453 mm. is received in 30 rainy days in the north-east monsoon period during the months of October, November and December. These rains are distributed and heavy rains to the tune of 100 mm. even are usually received in a single rainy day during the north-east monsoon period. Such torrential rains induce rapid run off attended by soil erosion. It is estimated that 30 per cent of the rainfall is lost by run off which carries about 6·4 tonnes of soil per acre per year.

(3) The main crops of the black soil area are cotton, cumbu and irungu cholam while different minor crops like blackgram, greengram and coriander are also sown mixed with cotton. The rotation adopted is neither uniform nor consistent in the tract. It varies with the status of the cultivator, the nature of lands and the price of the commodity in the market. In highly fertile lands, cumbu is grown year after year while in poor undulating lands fodder cholam is continuously cropped. However, the normal rotation is a two year rotation of cotton-cumbu. Occasionally a four year rotation of cotton-cumbu, cotton plus cholam is also adopted mainly to provide fodder to the work animals.

(4) Immediately after the receipt of rains, fodder cholam is sown and sowing of cotton is taken up subsequently. The sowing of cumbu is taken up last when the initial fury of the monsoon is mellowed. Seeds are usually broadcast and covered with country plough. Artificial fertilisers are very rarely applied. While cumbu is heavily manured with farmyard manure, cotton and fodder cholam are not usually manured with organic manures. Because of such poor inputs, very low yields of about 200 kg. of cumbu grains are usually obtained per acre. In years of drought these yields go down considerably. Very low yields of 25 kg. of kapas per acre are not uncommon. A dry land farmer usually gets a profit of Rs. 50 per acre and if he is fortunate to have a good season his profit may go upto Rs. 75 per acre.

(5) The poverty of the dry lands farmer is proverbial. The monsoon showers which condition agriculture, are often uncertain, precarious, meagre and ill distributed leading to periodic famines and scarcity, making the life of the cultivator extremely insecure. It is high time that facilities are made available for him to adopt improved agricultural practices and manure his crop adequately. As more than 48 per cent of the food output of the country is received from dry farming areas, this problem is to be tackled on a priority basis. The implementation of the Integrated Dry Land Agricultural Development Project in the Kovilpatti Taluk of Tirunelveli District will go a long way in meeting this challenge.

(6) *Name of the Project:* Project for the Integrated Dry Land, Agricultural Development in Kovilpatti Taluk of Tirunelveli District.

(7) *Objects of the Project:* (*a*) Carrying out research on dry farming at specially selected centres 'Regional Research Station, Kovilpatti',

(*b*) Practical application of the results on soil and moisture conservation practices,

(*c*) Cultivation of drought tolerant and short duration crops,

(*d*) Adoption of new techniques of fertilisation like foliar spraying of urea and

(*e*) Adoption of timely plant protection measures.

(8) *Scope of the Project :* The technical know how and the inputs will be made available on easy terms. Costly machinery like power sprayers, etc. will be kept in a pool and lent to ryots at nominal rents. Periodic inspection of the fields of the participants will be made and advisory work on plant protection, soil reclamation and water conservation will be intensively undertaken with a view to improve the yield potentials considerably.

(9) *Location :* The project will be implemented initially in an area of 2,000 acres which will be expanded under a phased programme and ultimately 8,000 acres will be brought under the project by 1973-74. With an eye on easy accessibility enabling frequent contact with farmers, and for rushing inputs, villages on either side of the Kovilpatti-Tuticorin Road have been given first preference and 2,000 acres in the Thittankulam, Chidambarapuram, Ilambhuvanam and Vijayapuri villages have been chosen to implement the scheme during 1970-71.

(10) It is proposed to raise dry cotton and cumbu in blocks of 1,000 acres each during 1970-71. While HB.3 will be the cumbu strain selected either K. 7 or MCU. 6 cotton (Bharathi) will be recommended for cultivation. HB. 3 has been chosen for its short duration, high yield and resistance to pests and diseases like ergot while K.7 and MCU. 6 have been selected based on their yield and quality. Research work done at the Regional Agricultural Research Station, Kovilpatti in these two crops has indicated that the application of 16 kg. of N and 8 kg. of P205 per acre and the adoption of line sowing with gorru following spacing of 45 cm. between rows and 15 cm. between plants in a row are the most suited practices to maximise the yield of both rainfed cotton and cumbu. Plant Protection Schedules have also been evolved. These recommendations will be adopted and the following package of practices will be recommended.

(a) Cumbu—rainfed

1. Variety ...	... HB. 3.
2. Season ...	... October-January.
3. Preparation of land...	Plough well and incorporate compost at 5 tonnes per acre.
4. Manures ...	... 16 kg. N and 8 kg. P205 as basal dressing at the time of sowing.
5. Seed Rate	... 1 to 1·5 kg./acre.
6. Method of sowing ...	Sow the seeds in lines with gorru.
7. Spacing ...	... 45 cm. between rows and 15 cm. between plants.
8. After cultivation	... Working dantulu twice.
9. Plant protection	... Spray or dust Ziram twice at the time of flowering at fortnightly intervals to check sugary disease on 45th and 55th day.

(b) Cotton—rainfed

1. Variety ...	... K. 7 or MCU. 6 (Bharathi).
2. Season ...	... October to May.
3. Preparation of land...	Plough well to get a good tilth.
4. Manuring	... 16 kg. N plus 8 kg. P205 per acre as basal dressing just before sowing.
5. Seed rate ...	... 5 to 6 kg./acre.
6. Seed treatment	... Treat seed with Agrosan at 2 gm. per kg. of seed.
7. Method of sowing ...	Sow the seeds in lines with gorru.
8. Spacing ...	... 45 cm. between lines and 15 cm. between plants.
9. After cultivation	... Working dantulu twice.
10. Plant protection	.. Dusting sevin 10 per cent four times at fortnightly intervals starting from one month after sowing.

Note.—If it is decided to give foliar application of urea on cotton, two sprayings one on the 40th day after sowing and the other on the 60th day after sowing each with 20 kg. of commercial urea per acre may be given.

Rainfed cotton can be profitably mixed with Co.1, blackgram in rows with spacing of 5 to 6 feet. The growth of cotton is not supressed by blackgram neither is its yield affected. About 150 kg. of blackgram valued at Rs. 225 will be obtained from this mixture from one acre and the additional cultivation expenses will be Rs. 20 per acre. The following will be the cost of cultivation for the crops recommended.

A basal application of 24 kg. of N is recommended for MCU. 6.

COST OF CULTIVATION PER ACRE

Particulars	HB. 3 Rs. P.	K. 7 Rs. P.	MCU. 6 Rs. P.
(1) Preparation	40·00	40·00	40·00
(2) Manures and manuring	65·00	80·00	100·00
(3) Seeds and sowing	15·00	10·00	10·00
(4) After cultivation...	15·00	25·00	25·00
(5) Plant protection	25·00	80·00	80·00
(6) Harvest	25·00	20·00	30·00
	185·00	255·00	285·00

	HB. 3	K. 7	MCU. 6
Yield/kg.	800	250	400
Receipts (Rs.)	450	500	800
Net profit (Rs.)	265	245	515

(11) If blackgram is mixed, the net profit, from cotton is increased by Rs. 100 per acre.

(12) As the farmers of dry farming tracts are economically most backward some special incentives are to be provided to the participating farmers if the scheme is to be successfully implemented. The Scheme Offers attractive subsidies and grants and the details are adduced in the following paras.

(13) *Inputs :* Fertilizers, seeds and pesticides, for 2,000 acres will be given at 50 per cent cost. The farmer's share of 50 per cent will be met by providing short term loans from commercial banks. The 50 per cent subsidy will be reduced to 25 per cent in 1971-72. The cost per acre of these inputs for HB. 3 works out to Rs. 100 and for cotton it is Rs. 200. So a sum of rupees three lakhs is required to meet the cost of the inputs required for the 2,000 acres.

(14) *Permanent Improvement :* Successful dry farming depends on conservation of moisture and its maximum utility. This consists of soil conservation, land development and water harvesting.

(*a*) *Soil Conservation :* Though there is no necessity for large scale soil conservation it may be necessary to form small bunds with bund formers across the slope of the land to arrest surface run off and sheet erosion and to work bucks scraper to level low lying patches. It may be necessary to provide 50, 4′ wide weirs, one for every 40 acres at Rs. 150 per weir. Grass waterways turfed on sides to prevent erosion are to be made to a length of about 10,000 feet at Rs. 10 per 100 running feet. In addition 500 Numbers of rough stone packing are to be provided at the rate of one per four acre plot at a cost of Rs. 35 per packing. It is also essential to provide check dams in the gullies to prevent erosion. The entire cost for all these operations would work out to Rs. 2 lakhs of which 75 per cent will be given as loan and 25 per cent as subsidy.

(*b*) *Land Development :* Major area in this dry farming tract does not require any drastic levelling. However, to remove pernicious weeds like hariyali, systematic digging is to be taken up and giving a disc-ploughing followed by tillering will be advantageous in as much as it will enable easy removal of harmful weeds besides providing good tilth which will aid conservation of moisture. A sum of rupees one lakh will be provided under this head at the rate of Rs. 50 per acre of which 25 per cent will be subsidy.

(*c*) *Water Harvesting :* Small ponds which are scattered in abundance in this tract will be strengthened in order to improve their potentiality both for supplying water for spraying the crop and also providing drinking water to the cattle. Incidentally this will improve the sub-soil water resources that will ensure a good crop under dry farming. Lining of existing channels with brick work will also be attempted to prevent excessive drainage water from entering into the

field and destroying standing crops and also to enable taking the excess rain water to nearby tanks. Application of sand to improve soil texture for allowing seepage of water and for preventing heavy cracking is also needed. The entire grant of Rs. 2 lakhs provided under this head will be profitably spent.

(15) *Infra Structural Arrangement*—(*i*) *Demonstration Plots:* In order to make effective occular demonstration of the economic results obtained in the Research Station it is envisaged to layout 30 demonstration plots in farmers' holdings. There will be thus 20 demonstration plots for HB. 3 cumbu and 10 demonstration plots for cotton where the utility of adopting the fertiliser level, line sowing and plant protection measures will be demonstrated. The entire cost of these demonstrations amounting to Rs. 5,000 will have to be treated as grant.

(*ii*) *Farmer's Training:* The Farmer's Training Centre, Kovilpatti, will undertake to impart training to progressive farmers in improved technology for which it is to be given a grant of Rs. one lakh.

(*iii*) *Equipments:* For the successful implementation of the scheme the following implements are to be purchased and made available to the farmers at subsidised rent.

		Nos.	Rs.
1.	Power sprayer cum duster ...	50	50,000
2.	Bucks scraper	20	2,000
3.	Gorru 1½ four tyned ...	100	7,500
4.	Bund formers	20	1,000
5.	Guntake	20	2,000
6.	Dantulu 8″ blade	100	3,000
7.	Power thresher	2	10,000
8.	Tiller—Mitsuibishi with trailors.	2	25,000
9.	Sprayers with ultra low volume nozzles	50	15,000

(The spending will be limited to Rs. 1·0 lakh which will be 100 per cent grant.)

(*iv*) *Foliar Spraying:* The new technique of foliar spraying of urea will be made and it will be given to cotton as detailed in the package of practices. The cost is met with 50 per cent subsidy.

(*v*) *Sprinklers Irrigation and Lining of Channels:* One sprinkler unit will be erected as a demonstration at a cost of Rs. 25,000 with 50 per cent subsidy.

(16) To improve the economic status of the poor dry land farmers it is desirable to provide subsidiary avocations to engage himself profitably in lean months. With this objective in view the following provisions have been made under Animal Husbandry.

	Rs.
(*i*) Supply of 150 graded buffalloes at Rs. 1,200 per animal	180,000
(*ii*) Supply of 50 graded cows at Rs. 1,000 per cow	50,000
(*iii*) Supply of 320 Ewes and 8 Rams at Rs. 80 each	26,240
(*iv*) Supply of 10 units of poultry with provision of building deep litter houses at Rs. 500 per unit ...	5,000
(*v*) Improvement of cattle shed providing imporous sloping floor, collection channel and collection pit 40 Nos. at 300 per shed	12,000
(*vi*) Cultivation of perennial grass in 25 cent plots—100 plots at Rs. 50 per plot	5,000
(*vii*) Miscellaneous items (lump sum) ...	21,760
Total ...	300,000

Of this, Rs. two lakhs will be issued as loan and the remaining Rs. one lakh as grant. The scheme will be implemented by the Project Husbandry Adviser attached to the Project.

NOTE I

DETAILED TOTAL COST ESTIMATES FOR PROJECT

(Rs. in lakhs)

Area (in acres)—2000	1970-71	
	Loan	Grant
I. Inputs (Fertilisers, seeds, pesticides at Rs. 150·00 per acre)	1·50	1·50
II. Permanent works	2·25	2·75
(i) Soil Conservation at Rs. 2·00 lakhs ...	...	...
(ii) Land Development at Rs 1·00 lakh ...	...	...
(iii) Water harvesting at Rs. 2·00 lakhs ...	...	...
III. Infra-structure and Establishment Cost	...	...
(i) Demonstrations	...	0·05
(ii) Farmer's Training	...	1·00
(iii) Farm Machinery Implements and Plant Protection Equipment...	...	1·00
(iv) Spraying of Urea and Pesticides	0·05	0·35
(v) Minor Irrigation and Sprinkler irrigation ...	0·60	0·10
(vi) Animal Husbandry	2·00	1·00
(vii) Project Establishment	...	1·00
Total (Items I, II and III) ...	6·40	8·75

NOTE II

FINANCIAL IMPLICATIONS OF THE SCHEME

(Rs. in lakhs)

Item	1970-71	
	Total cost	Provision to be made in the scheme
I. Current inputs per project	3·00	1·50
II. Permanent works per project	5·00	5·00
III. Infra-structure and establishment per project ...	7·15	7·15
Total ...	15·15	13·65

CHAPTER V

MARKETING PROBLEMS AND PERSPECTIVES OF THE DRY FARMERS

Present Marketing Arrangements

The structure and organisation of agricultural markets and the nature of the marketing problems vary from crop to crop. At present there is little difficulty in marketing the produce of the dry farmers since dry farming has not been undertaken on a large scale. Co-operatives have handled a negligible amount of the total produce as shown in Table 1.

TABLE 1—VALUE OF AGRICULTURAL PRODUCE MARKETED BY CO-OPERATIVES DURING 1967-70 IN TAMIL NADU

Serial No.	Name of the Commodity	Amount (Rs. in lakhs)
1	Food grains	780·05
2	Cotton	185·11
3	Oil seeds	229·78
4	Others	256·69
5	Sugarcane	995·47
	Total ...	2447·10

Source : The Records of the Registrar of Co-operative Societies, Madras.

Unlike commercial crops, where the greater part of the produce is intended for marketing, millets have a great local demand. The quantities retained by the producers for their domestic consumption, for payment towards wages and seeds, and the quantities that may be available for marketing vary from producer to producer and from tract to tract depending upon such factors as the extent of area cultivated, method of raising the crop, nature of the crop or crops raised, food habits of the farmers, etc. In the case of small holdings almost the entire produce is retained on the farm. Only in the case of big holdings are surpluses available for marketing.

The surplus available for marketing is disposed of in the villages and in the nearby centres. In cases where there are sizable quantities for sale, these are marketed in the nearby assembling centres as shown in Table 2.

TABLE 2—PERCENTAGE OF THE TOTAL QUANTITIES HANDLED BY THE AGENCIES IN THE DIFFERENT DISTRICTS IN 1960-61

Serial No.	Name of the agencies moving the produce to the wholesale assembling markets	North Arcot	Tiruchi	Chingleput
1.	Producers . .	10%	15%	20%
2.	Landlords	25%	20%	10%
3.	Village Merchants ...	60%	40%	20%
4.	Wholesale merchants, commission agents and agents	5%	25%	50%
5.	Co-operative organisations.	...	...	...
6.	Others	...	...	...

Source : Report on the Marketing of Millets in Madras State in 1960-61.

Co-operative Organisation

Co-operative organisations like the Marketing Societies do not have any role in the wholesale distribution of millets. They merely act as agents, providing loans on the pledge of the produce. Very rarely do they arrange for sale or participate in the wholesale distribution of millets.

In the case of locally grown millets, the wholesalers finance the wholesale distribution from their own resources. They are to some extent helped by the banks through overdraft accommodation facilities. The importers of cholam and other millets from other States finance their trade from their own resources. Some of them pledge

the produce in the State godowns or the Central Warehousing Corporation working in their area and obtain loans upto 75 per cent of the value of the produce from scheduled banks on pledging the warehousing receipts. In a few cases they also arrange for loans from scheduled banks by way of overdraft accommodations.

The part played by the co-operative organisations in the retail distribution of millets is insignificant. The co-operative stores, particularly in rural areas in the course of their normal distribution of commodities, purchase a few bags of local millet or millets in demand and distribute them in retail making a small margin. But such retail distribution by stores forms an insignificant portion of the total quantity distributed in retail in the State. The co-operative stores while acting as fair price shops also distribute in retail, cholam and maize obtained from the Central Storage Depots under the control of the Regional Directorate of Food, Madras.

Through the Regulated Markets also some of the dry crops such as cotton and groundnut are being marketed. There is a Regulated Market Committee for each district. Table 3 below gives information for seven district markets.

TABLE 3

South Arcot Market Committee (in tonnes)

Year	*Groundnut*	*Cotton*
1960	66,330	101·4
1964-65	69,491	401·0
1967-68	85,881	751·3
1968-69	87,242	783·1
1969-70	51,416	636·4

North Arcot Market Committee (in tonnes)

Year	*Groundnut*
1960	1,931
1964-65	18,977
1967-68	34,369
1968-69	39,806
1969-70	20,206

Tiruchi Market Committee (in tonnes)

Year				*Groundnut*
1960	...	...	...	3345·6
1964-65	...	...	...	6400·0
1967-68	...	...	...	8014·9
1968-69	...	...	...	8142·5
1969-70	...	...	...	2111·8

Tirunelveli Market Committee (in tonnes)

Year			*Groundnut*	*Cotton*	*Blackgram*
1960	...	...	...	...	...
1964-65	...	...	...	27,018	...
1967-68	...	...	31,995	179,651	...
1968-69	...	...	27,423	801,656	1,869
1969-70	...	...	44,160	245,379	7,764

Thanjavur Market Committee (in tonnes)

Year				*Groundnut*
1960	...	...	...	...
1964-65	...	...	...	4,220
1967-68	...	...	...	4860·803
1968-69	...	...	...	5908·177
1969-70	...	...	...	3833·409

Ramnad Market Committee (in tonnes)

Year			*Groundnut*	*Cotton*
1960	...	...	...	...
1964-65	...	...	131,176	0·700
1967-68	...	...	144,900	...
1968-69	...	...	51,600	5,800
1969-70	...	...	132,900	7,900

Coimbatore Market Committee (in tonnes)

Year			*Groundnut*	*Cotton*
1964-65	...	...	22,200	42,500
1967-68	...	...	59,156	45,197
1968-69	...	...	182,273	116,272
1969-70	...	...	419,084	80,555

Source: Report on Agricultural Marketing in Tamil Nadu, Directorate of Agriculture, Madras.

Most of the dry crops are not marketed through the Regulated Markets or through Co-operatives as their marketable surplus is negligible. Only cotton and groundnut are exported to other States. The important centres of movement are Kovilpatti, Salem, Villupuram, Panruti, Shenkottai, Pollachi, Udumalpet and Hosur. As dry farming technology spreads and to help it to spread, there is need to develop regulated markets in every taluk.

There are marketing societies which provide pledge finance, while some advance agricultural production loans. "Suspense loans" are also given to needy cultivators who bring their produce to the society and demand advances against it. The distinctive feature of these loans is that the society could sell the produce when it chooses and adjust the sale proceeds against the loan when the borrower next visits the society. These advances are a sort of inducement to the cultivators to sell their produce to the society. These loans are given only to individual members for a period of six months. The period could be extended to nine months or even one year in exceptional cases, provided the commodity pledged remains in good condition. The amount of loan as per the rules framed by the Central Bank is not to exceed 75 per cent of the market value in the case of foodgrains and 60 per cent in the case of commercial crops. The amount of pledge loan that can be sanctioned to an individual member does not exceed Rs. 10,000 though in special circumstances the limit is enhanced with the previous permission of the Central Bank. It is noteworthy that there is no procedure to relate the quantum of produce pledged to the area cultivated by borrowers. A member who wants to avail himself of the pledge loans facility has first to obtain a receipt for having deposited his produce in the society's godown and hand it over to the society. The loan is then disbursed by the Manager either on the same day or the day following.

The societies also provide godown facilities for the pledged produce at a nominal rate. These loans do not involve much procedural delay and carry interest at $9\frac{3}{8}$%; the produce given as security for the suspense loan is stored in the society's own godown. The charges payable by the seller to marketing societies include Commission and weighment charges.

Some Comments on Current Marketing

Marketing societies have no uniform pattern of rates in respect of their various charges. With regard to the provision of ancillary facilities like transportation, assembling, grading and pooling which are particularly important for the increased dry crop production proposed, the marketing societies have not yet developed an agreed policy.

Some marketing societies function in an unsatisfactory manner. Their business is not confined to the genuine cultivators but extends to purchases from traders. This could be particularly serious for the dry farmer. The traders have acquired a strong hold on the management of some societies and have turned them to their own advantage. In certain districts, the marketing societies charge "release" commission to pledge loans. The pledged produce is included in the turnover of marketing business. Even fictitious marketing transactions are recorded by the officials of some of the societies. In view of these factors, the volume of actual marketing business transacted for the benefit of the cultivators is limited.

The main causes of failure of market societies are (a) absence of co-operation from the cultivators as well as from the traders in regard to the market committee in abiding by the regulations, (b) failure of the market committees to provide the cultivators with basic amenities including storage facilities at the markets, (c) failure to notify all important crops to the markets, e.g., paddy in North Arcot, groundnut in Tirunelveli, etc., (d) failure to introduce the auctioning method of sale which the cultivators prefer to direct negotiations and (e) the restrictions of the market committee's interest to issuing licences and collection of cess.

Recommendations for Improved Marketing

The development of marketing arrangements for dry farming produce must of course be part of the organisation of marketing for all agricultural production in any given area. In relation to the prog-

ramme for renovated dry farming proposed in this study, it is recommended that during the Fifth Plan a hierarchy of primary, secondary and terminal marketing societies be developed in the three districts of the State—Dharmapuri, Ramanathapuram and Tirunelveli under the overall guidance of the dry farming Authority. These regulated markets would on behalf of the State Trading Corporation, the Food Corporation of India and on behalf of itself purchase produce outright from the farmer, particularly the small dry farmer and arrange for that part of such purchases which have to be sold, to be marketed at terminal and other consumer centres.

Within such a frame of regulated markets arrangements should be made for adjusting the sale proceeds of produce sold by cultivators through the marketing society towards repayment of loans owed by them to co-operative societies. This is vital for the dry farmer. The CentralBank could direct all the credit societies in the different districts to obtain a written declaration from every borrower of short-term loans that he would sell his produce through the marketing society. In some districts the marketing societies are in league with credit societies so that instead of delivering the stocks at the latter's door they supply them directly to the individuals. The margin accruing to the marketing and credit societies are appropriated by the office-bearers of these societies who produce fictitious vouchers of transport. To avoid such problems, the Central Bank should supervise the work of the marketing societies. There should be a set up of commission agencies which might assist the millers and traders in building strong ties with the cultivators.

The restructuring of marketing societies is essential. They should have a trained manager and secretary. There should also be a purchase and sale union. The availability of processing facilities is an important factor for the development of co-operative marketing. Above all, in the case of dry farm production, the marketing societies should make arrangements for assembling the produce at the village and should also grade and pool the produce before sale in the market. The main objectives of the marketing societies should be advancing of pledge loans, marketing of agricultural produce and distribution of supplies. The sales effected by marketing societies should constitute a very significant proportion of the total produce from dry farmers coming into the market. The marketing societies should inspire in these cultivators confidence in their ability and scope as good marketing insti-

tutions. The relationship between the members of the credit societies and the co-operative marketing societies should be spelt out and standardised.

Under the programme to develop co-operative marketing, a number of measures need to be taken or strengthened, such as State participation in share capital, management subsidy, loans and subsidies for construction of godowns and finance for marketing at concessional rate of interest. Along with these measures, there should be some consolidation of the societies to ensure that they work at a profit.

The Central Bank should play an active role in the development of co-operative credit and marketing. In North Arcot, the Central Bank played a vital role in the development of co-operative credit by endeavouring to attain targets relating to increase in membership, affiliating of credit societies with marketing societies, pledge loans, etc.

Further provision should be made against the domination by traders of such societies. One way to effectively meet this situation is to build up institutional trade channels both for collecting the produce at the village level preferably through the agency of the affiliated credit societies and its disposal at the terminal markets through the district, regional or apex marketing societies. In the absence of such an integrated organisation, the marketing societies depend on traders who exploit the situation to their benefit, including the day-to-day affairs of the society.

The purpose of a national and regulated marketing system is to enable the farmer particularly the dry farmer to secure for his produce a more remunerative price and a more efficient but less costly market service than is otherwise available to him. There should, therefore, be a planned effort to create and reorganise marketing societies in order to make them an effective alternative to the private agencies under which the farmer loses part of his income. The success of marketing arrangements is dependent upon a combination of factors, the total output, the co-operation of farmers, legislation and trained personnel to run the organisation. These conditions can and should be created in the State so as to integrate marketing with processing and advancing pledge loans to the cultivators. Such a marketing organisation, planned, developed and restructured is an essential precondition for the programme of HYV dry farming proposed in this study.

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